



Brief guide to the National Biodiversity Strategy

Table of contents

Foreword	1
Introduction	
Why is it important to conserve Biodiversity?	2
The National Biodiversity Strategy	4
Main Themes and Strategic Objectives	
Biodiversity and Ecosystem Services	6
Biodiversity and Climate Change	8
Biodiversity and Economic Policies	10
<i>Coordinated by:</i> Alessandro La Posta Eugenio Duprè	
<i>Texts by:</i> Marina Andreella Benedetta Brecciaroli	
<i>Thank you to the following people for their suggestions:</i> E. Bianchi, F. Cappelluti, L. Carnevali, V. De Nardis, L. Eleuteri, S. Gomes, A. Maggiore, F. Pani, E. Perinelli, L. Pettiti, C. Picchiotti, S. Salandri, S. Sartori, N. Tartaglini, V. Vindigni.	
<i>Photographs:</i> M. Branchi, F. Callan, G. Carrara, L. Minuto, E. Coppola, G. Marcoaldi, A. Nardi	
@ 2012 All rights reserved Ministry for the Environment Land and Sea Protection	
Layout, graphics and editorial assistance care of Palombi & Partner Srl Via Gregorio VII, 224 00165 Roma www.palombieditori.it	
Finished printing in February 2012	
ISBN 978-88-6060-423-1	
Work areas	12
1. Species, Habitats and Landscape	14
2. Protected Areas	16
3. Genetic Resources	18
4. Agriculture	20
5. Forests	22
6. Inland Waters	24
7. Marine Environment	26
8. Infrastructures and Transportation	28
9. Urban Areas	30
10. Health	32
11. Energy	34
12. Tourism	36
13. Research and Innovation	38
14. Education, Information, Communication and Participation	40
15. Italy and Global Biodiversity	42
The 2011-2020 challenge in the world	44
The 2011-2020 challenge in the European Union	46
The 2011-2020 challenge in Italy	48
Essential bibliography and webliography	49

To Maristella, whom we all miss.

*Nihil durare potest tempore perpetuo:
cum bene sol nituit, redditur oceano,
decrescit Phoebe, quae modo plena fuit,
ventorum feritas saepe fit aura levis.*

*Nothing lasts in eternity:
The sun which just shone, disappears behind the ocean,
A full moon begins to wane.
Violent winds often turn into light breezes.*

Pompei, from a tavern of the Regio IX

Foreword

In 2010, the International Year of Biodiversity, Italy developed for the first time a National Strategy for Biodiversity. The road to this achievement was long and included the participation and sharing of stakeholders, scientists, the Regions, and the entire government. Policy sectors must be fully integrated into environmental protection policy sectors with the active participation of stakeholders and the government at every level, because the conservation and sustainable use of Biodiversity are vital to ensure a future to humanity and to maintain economic prosperity and well-being.

Italy now possesses an updated tool ready to tackle the most recent undertakings taken on at a European and global level for the conservation of Biodiversity up to 2020 and beyond.

In this brief explanatory guide, we hope to provide a working tool to all those who are involved, in a variety of capacities, towards its achievement.

Stefania Prestigiacomo

Introduction

The approval of the National Strategy for Biodiversity puts into action the undertakings taken on in signing of the Convention on Biological Diversity and provides a tool for integrating the demands of conservation and sustainable use of Biodiversity into national policies. I would like to thank everyone who with their expertise and passion collaborated in this General Directorate and elsewhere for this result.

It is now time to take action, and this publication is meant to give support in this pursuit.

Renato Grimaldi

Why is it important to conserve Biodiversity?

Conserving Biodiversity is not a luxury or an ambition of environmentalists, on the contrary, it is an unavoidable requirement for guaranteeing our future.

If on the one hand, conservation of the Biodiversity richness of our Planet must be considered a moral obligation to future generations, on the other it is becoming an economic obligation. Indeed, the abundance of species and complex life forms that surround us has an intrinsic importance, not only ecological but also economic, social and ethical.

Ecological Importance

In order to safeguard development opportunities for future generations, insofar as is possible all species should be preserved in terms of their genetic diversity and the diversity of their habitats, even though their specific functions in the balance of nature and the benefits that can be derived from them are still not completely known. The principle of precaution should, therefore, also be applied to biological diversity.

In general, it can be said that the greater the degree of genetic diversity, the more able a species is to adapt to new living conditions produced by climate changes. Ecosystems with species diversity are better able to withstand external disruptions than more simple ecosystems already negatively impacted by the loss of Biodiversity.

Economic Importance

Biodiversity supports our economy and our quality of life by supplying us with a wide variety of direct economic benefits, which too often go unrecognized and underestimated.

Of course, it is difficult to estimate the value of Biodiversity owing to its intrinsic complexity.

Nature supplies us with a wide range of services which would otherwise be partly obtained only through technological means at a great expense. The more intact the self-purification of our soils and water bodies, the easier and more cost effective it becomes to obtain drinking water.

The greater the natural fertility of the soil, the less fertilizer needs to be utilized. The more plants and trees we plant in our cities, the more dust and pollutants will be naturally filtered from the air.

There are no artificial means that can replace pollination by insects, nor will it ever be possible to replace the aesthetic and recreational value that nature has to offer.

It is, therefore, necessary to conserve Biodiversity as an essential component of what can be defined as our “natural capital”.

“ *Biological Diversity or Biodiversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.* **”**
(CBD, Rio de Janeiro 1992)

Social and cultural importance

Contact with nature is a key aspect of every individual's development, and, in some ways, an innate need that reinforces a sense of vitality, increases the sense of perception and aesthetic sensitivity, helps to reduce aggressiveness, encourages attentiveness, concentration and intuition and helps sharpen all our latent capacities.

Uncontaminated nature satisfies man's creative need more than anything man is able to create artificially; in a process that has lasted thousands of years, the human species has learned to identify itself with the natural world and adapt to it sensorially, emotionally and rationally.

In 21st century society, perception of the value attributed to nature, each individual's attitude towards protection and sustainable use of biological diversity and the personal approach to environmental problems vary significantly depending on gender, age, lifestyle, and social and cultural environment.

It is, therefore, fundamental to raise public awareness of Biodiversity's contribution to the well-being of humankind through sensitivity education and information in order to create a “culture of Biodiversity”.

Biodiversity Strategy

Ethical importance

In addition to the ecological, economic, social and cultural reasons, there are also ethical reasons for conserving biological diversity that stem from its intrinsic value. Clearly, different viewpoints exist concerning said intrinsic value and the exact rights which can be attributed to Biodiversity, all of which must be respected.

There are three prevailing positions: firstly, the anthropocentric position that refers to the benefits man has in preserving species, genes and ecosystems, addressing our responsibility to conserve natural resources for future generations; secondly, animal ethics which attributes an intrinsic value to all creatures capable of feeling suffering; finally, biocentric ethics, which

strongly criticizes both of the previous positions as not being sufficiently far-reaching and which calls for recognition of the inherent value of Nature. The implications of recognizing the intrinsic value of Nature have sparked a considerable amount of controversy among supporters of this theory, with particular regard to the question of whether all living creatures should be given equal ranking with regard to their inherent value, or whether this should be graduated according to their level in the natural order.

The ethical approach to biological diversity may be applied at different levels but, overall, it culminates in the obligation to preserve the current global level of Biodiversity for as long as possible.



Mindful of the importance of Biodiversity, and within the commitments undertaken at the international level with the ratification of the Convention on Biological Diversity (CBD, Rio de Janeiro 1992), Italy adopted a National Biodiversity Strategy.¹

The National Biodiversity Strategy is a very important instrument for ensuring integration between the country's development objectives and the protection of its priceless Biodiversity heritage for years to come.

The path

In the agreement made at the meeting of the "Conferenza Permanente per i rapporti fra lo Stato, le Regioni e le Province Autonome" (State-Regional Permanent Conference) held on October 7, 2010, the process of approval of the National Biodiversity Strategy was completed following coordinated action between the Ministry for the Environment, the Regions and the Autonomous Provinces of Trento and Bolzano.

Throughout 2010, declared by the United Nations to be the "International Year of Biodiversity", the first draft of the Strategy opened up a process of participation and sharing between various involved institutional, social and economic key players, which through specific territorial workshops culminated in the National Conference for Biodiversity held in Rome from May 20 – 22, 2010. The results of the work of the Conference and the numerous contributions made allowed for a new draft of the Strategy, which represented the starting point for the official discussions within the "Conferenza Stato-Regioni" ("State-Region Conference").

Implementation

The implementation of the National Biodiversity Strategy requires a multidisciplinary approach and a great amount of sharing and collaboration between policy makers and central and regional administrations, with the support of the academic and scientific world, as well as welcoming stakeholders' requests.

It was for this reason that the "Conferenza Stato-Regioni" ("State-Region Conference") was chosen as the venue for policy discussion and decision making with regard to the Strategy; the Ministry for the Environment established a



special Joint Committee, composed of representatives from Central Administrations, Regions and Autonomous Provinces in order to support the activities of the "Conferenza". The National Biodiversity Observatory offers scientific technical support to the Joint Committee.



The Consultation Table, which involves the Joint Committee and representatives of main economic/productive and environmental associations, allows for the constant and full involvement of all stakeholders in the process of implementing and reviewing the Strategy.

¹ The entire text of the strategy can be downloaded from the website www.minambiente.it in the Nature/Biodiversity section.

Evaluation

The Strategy will be implemented in the 2011- 2020 period. Every two years, a report on the progress of its implementation will be issued. In order to evaluate the efficiency and efficacy of the National Biodiversity Strategy, a system of periodic monitoring will be set up, based on a set of indicators that allow for the evaluation of the effectiveness of the policies undertaken, the achievement of specific objectives through priority measures so that the vision can be attained, and the strategic objectives.

For this purpose, two distinct types of indicators should be identified:

- *result and impact indicators*, i.e. evaluation indicators, to be used for monitoring the success of the Strategy in attaining the vision and reaching the strategic objectives;
- *status indicators*, i.e. indicators for monitoring the success in achieving conservation objectives of Biodiversity elements (species, habitats, landscape) through the priority measures identified in the work areas.

All indicators:

- should be recognized as having ecological significance;
- should be sensitive;
- should have broad applicability;
- should be relatively simple and inexpensive detection indicators.

The system of indicators must make specific reference to the diverse complexity and organization of the Italian territory and, consequently, to the problems in managing floristic, vegetation, forest, faunistic and hydrobiological features, in addition to environmental disturbance and degradation.

The indicators are fundamental to policy development since they offer a rapid and easy way to highlight important signs and show general trends on the status of Biodiversity. They work a bit like the gas tank indicator or the temperature indicator on the dashboard of a car, which indicate the car's status of efficiency, and in the event of a malfunction, allow the driver to take immediate action.

The Structure

The vision

In recognition of the intrinsic value of Biodiversity and its essential importance for the well-being of humankind, the Strategy is meant to be an instrument that integrates the needs of conservation and the sustainable use of natural resources in national sectoral policies.

The vision for Biodiversity conservation of the Strategy stems from this consideration.

“ *The vision: Biodiversity and ecosystem services – our natural capital – are conserved, valued and, insofar as possible, restored for their intrinsic value so that they can continue to support economic prosperity and human well-being despite the profound changes that are taking place globally and locally* **”**

Key issues

In order to achieve the vision, the National Strategy is structured around three key issues.

KEY ISSUES

Biodiversity and ecosystem services;
Biodiversity and climate change;
Biodiversity and economic policies.

Strategic objectives

In relation to each of these issues, three strategic objectives have been identified, each complementing the other, stemming from an attentive technical and scientific evaluation which considers safeguarding and recovering ecosystem services and their essential relationship with human life as a priority for the implementation of Biodiversity conservation.

The strategic objectives aim at ensuring the permanence of ecosystem services necessary for life, at facing on-going economic and environmental changes, and at optimizing the synergy processes between sectoral policies and environmental protection.

Biodiversity and Ecosystem Services

An ecosystem is a complex and dynamic combination of plants, animals and microorganisms that interact with each other and with the environment around them.

Ecosystem services are “the multiple benefits provided by ecosystems that are of fundamental value for human life” (Millennium Ecosystem Assessment, by the Ministry for the Environment, 2005), such as water supplies and water purification, the natural recycling of waste, and the formation of soil.

Since many of these services have always been available for free, their value has not been fully evaluated, especially from an economic point of view.

There are four types of ecosystem services:

- **supporting services, which include, for example, soil formation, photosynthesis and the nutrient cycle that underpin growth and production;**
- **provisioning services, which provide actual goods, such as food, water resources, timber and medicines;**
- **regulating services that regulate climate, water (flooding, for example), waste and the spread of diseases;**
- **cultural services, concerning beauty, leisure and amusement that contribute to our spiritual well-being.**

The basic concept is that the well-being of humankind depends on the services that Nature provides; we must, therefore, overcome the contrast existing between Nature conservation and the economic exploitation of natural resources.

It is of fundamental importance to recognize the types of ecosystems and services, and define their geographic borders and specific functions.

		Ecosystem services												
		Support		Provisions				Regulation				Cultural		
Types	Areas that are potential suppliers of services in Italy	Pedogenesis	Cycle of nutrients	Food	Water resources	Raw materials	Genetic and biochemical resources	Climate	Food and water quality	Soil conservation	Waste processing	Educational	Aesthetic and recreational	Cultural and religious
Glaciers	Alps				x			x	x			x	x	
Mountains	Alps and Apennines	+	+		x		x	x	x			x	x	x
Forests	Mature forests in the Alps and in the Apennines	x	x	+	x	x	x	x	x	x		x	x	x
Rivers, lakes, wetlands	Main rivers and lagoons		x	+	x		x	+	x	+		x	x	+
Arid areas	Internal southern environments			+		+	x	+				x	x	x
Cultivated areas	Quality rural environment in particular hilly areas		+	x	+	x	+	+	+	+	x	x	x	
Costal areas and islands	Coasts in general and small islands		x	x	+		x							
Seas and Oceans	Mediterranean Sea		x	x				x				x	x	

Classification of ecosystems in Italy according to environmental type.
 + “services existing in Italian environments”;
 x “services of significant importance present in Italy”

From MA 2005 Modified

Biodiversity, which is essential for the survival of ecosystems and the maintenance of their operation, is threatened, and many forms of Biodiversity have already disappeared.

Recent studies show that:

- 11% of the natural areas present on Earth in the year 2000 could be lost by the year 2050;
- nearly 40% of existing agricultural land risks being turned into land for intensive agriculture;
- 60% of the coral reef could disappear by 2030;
- in Europe, 80% of protected habitats are at risk;
- human activity has multiplied the extinction of species by 50-1,000 times in the last 100 years.

“ Strategic objective 1:
By 2020, ensure the conservation of biodiversity, or the variety of living organisms, their genetic diversity and the ecological complexes of which they are part, and ensure the protection and restoration of ecosystem services in order to guarantee their key role for life on Earth and human well-being ”

Up to now, ecosystem services have been protected primarily by means of regulation. The international community, however, is now working on identifying economic means that may be useful.

Management of water services in New York: an example of PES

A concrete example of a successful PES is the agreement that was signed between the municipalized agency for the water supply service of the city of New York and the forest owners of the collection basin. On the basis of the agreement freely signed, the owners undertook to manage their own forests according to a program that requires practicing forest management with positive effects on the quality and quantity of the water flow.

Compensation for the ecosystem services carried out is paid through a surtax on the water tariff, which is paid by the end user.

Implementation of the program has allowed to obtain a partial savings on the 6-9 billion dollars that would have been necessary to construct purification plants, a cost which would have been shouldered by the citizens, whereas the forest owners relied on an annual and constant flow of revenue.

[Landell-Mills and Porras, 2002].

An effort is being made to add to old principles, even those commonly accepted such as the “polluter pays principles”, new ones such as the so-called Payment for Ecosystem Services (PES), i.e. market mechanisms based on economic incentives. The PES mechanism is based on the creation of economic advantages for operators who have the potential to offer, maintain or enhance specific ecosystem services. This entails, on the one hand, transforming the ecosystem service into an actual market product, and, on the other, recognizing the right of the producer of the service itself to request economic compensation from the consumer of the good.



Biodiversity and Climate Change

In recent decades, traditional threats to Biodiversity, such as the loss and fragmentation of habitats and their degradation, have continued to intensify. Climate change has added to these phenomena, often acting in combination with them and exacerbating the effect.

The impact of climate change on Biodiversity is already visible: the distribution of species, flowering periods, and the migration of birds, for example, are changing. On the other hand, even though threatened by climate change, Biodiversity has a huge potential to mitigate the impact.

There are two main approaches for responding to the effects of climate change, thereby reducing the vulnerability of the human species and of the ecosystems:

Mitigation and adaptation.

Mitigation, on a global level, entails a clear reduction in greenhouse gases and the protection and promotion of plant ecosystems, such as carbon sinks, through appropriate management of land and habitats, and the use of energy sources (bio-energy) in place of fossil fuels that increase the concentration of greenhouse gases in the atmosphere. Mitigation at a local level includes land management and the creation of habitats that can maintain a certain microclimatic stability.

Climate Impact	Adaptation based on ecosystems
More frequent dry spells	Use of suitable cultivation and forest practices in order to increase water retention capability and ease episodes of drought
Heat Spikes	Increase in greenery areas in cities in order to improve the microclimate and air quality
Flooding of riverbeds	Maintenance and recovery of wetlands so that they act as natural protection against flooding
Heightened fire Danger	Cultivation of diversified forest, that are more resistant to infestations and that have a lower fire susceptibility

From Environmental Factsheets "The role of nature in climate change"

Adaptation to climate change may occur as a natural response by the ecosystems, or it can be planned and caused by man, always with the awareness of the extreme complexity of ecosystems and the difficulty in foreseeing the actual consequences of the measures adopted.

Adaptation to climate change can be implemented in three ways:

Resistance: maintain a relatively constant status in response to stress;

Resilience: rapid recovery in response to stress;

Response: facilitate the transition of ecosystems from current conditions to new conditions.



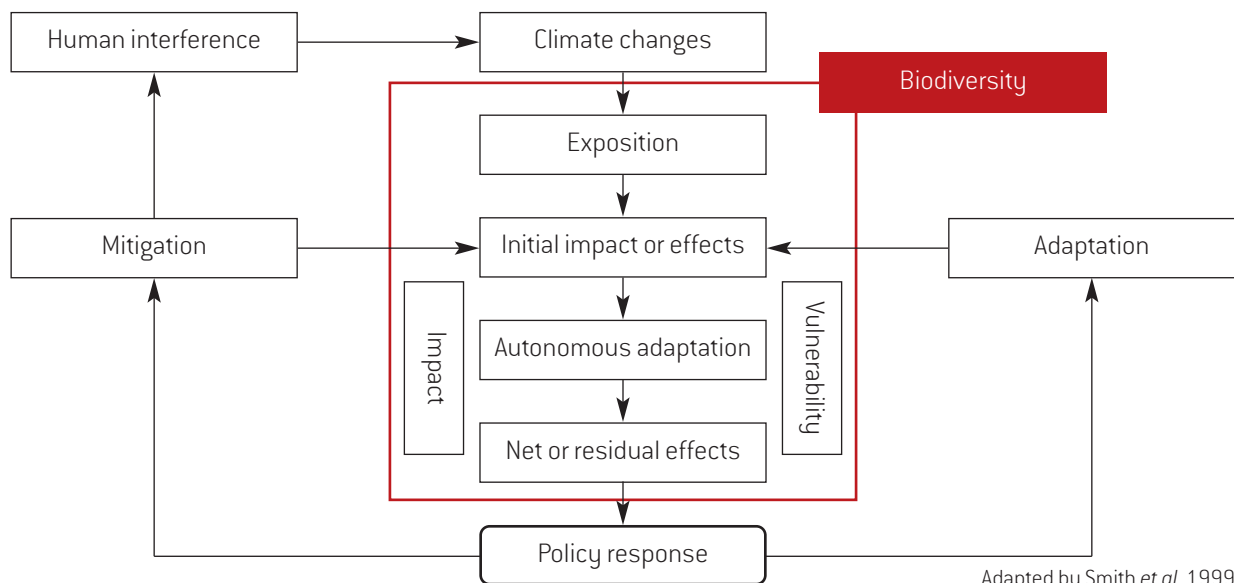
Biodiversity and the functions of the ecosystems help us to adapt to climate changes and to mitigate them. They must, therefore, be an essential component of our commitment in the fight against climate change.

Spontaneous adaptation is often insufficient to counter the effects of climate change on Biodiversity; humans must, therefore, take certain steps to foster mitigation or adaptation of natural ecosystems to climate changes.

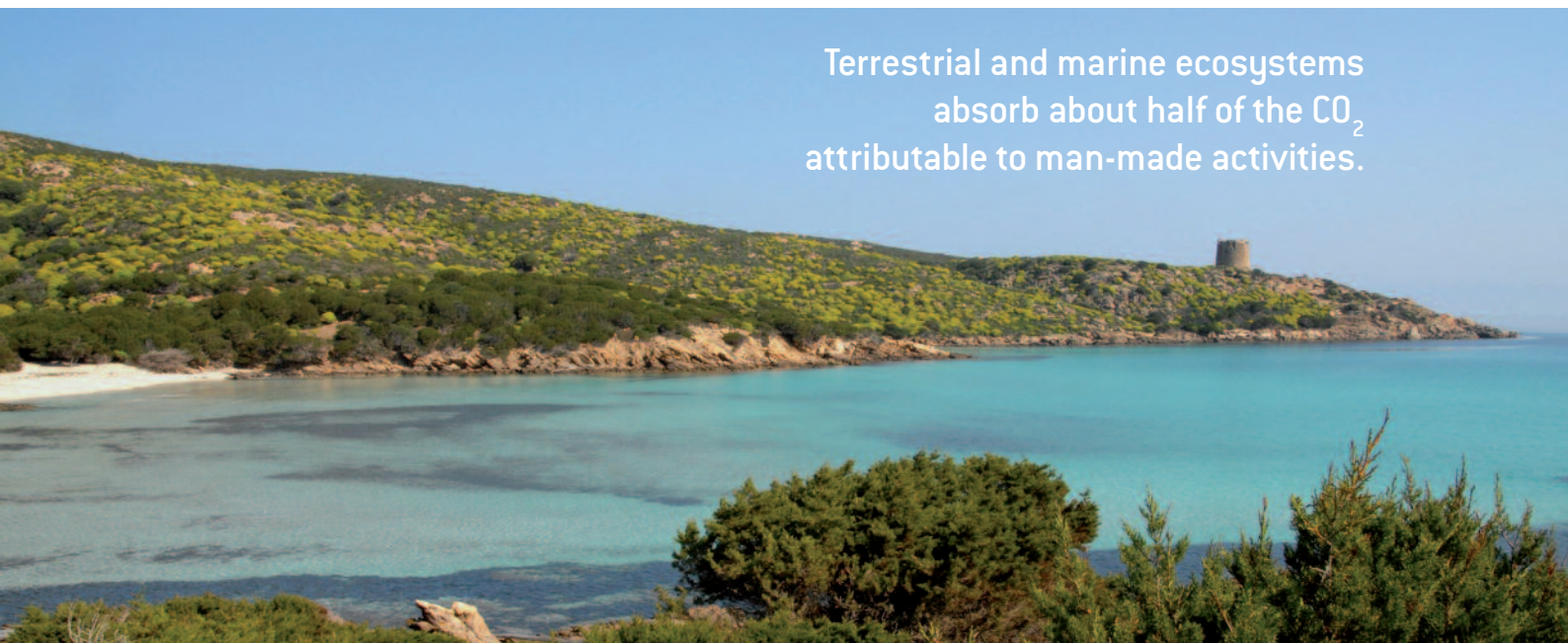
Biodiversity Strategy

Mitigation and adaptation measures with regard to climate change can have a determining effect on the impact on Biodiversity: the impact can vary according to the kinds of action taken and the way in which they are implemented, depending on the habitats and species involved and the spatial and temporal scale taken into consideration. Obviously, care must be taken to avoid types of mitigation and adaptation that produce negative impact on Biodiversity, whereas measures having a positive impact must be researched and promoted in order to counter climate changes. Naturally, before enacting any kind of response policy through mitigation and adaptation, understanding of the impact of climate change on Biodiversity must be increased by analyzing the net or residual effects that climate change has on species, habitats and ecosystems.

Strategic objective 2:
By 2020, substantially reduce the nationwide impact of climate change on biodiversity, by defining the appropriate measures to adapt to climate changes and mitigate their effects and by increasing the resilience of natural and semi-natural ecosystems and habitats



Terrestrial and marine ecosystems absorb about half of the CO₂ attributable to man-made activities.



Biodiversity and Economic Policies

The current course of social-economic growth, often driven by purely economic considerations, does not ensure adequate conservation of Biodiversity and ecosystem services. On the contrary, present global models of production and consumption tend to negatively influence the resistance of natural and semi-natural ecosystems.

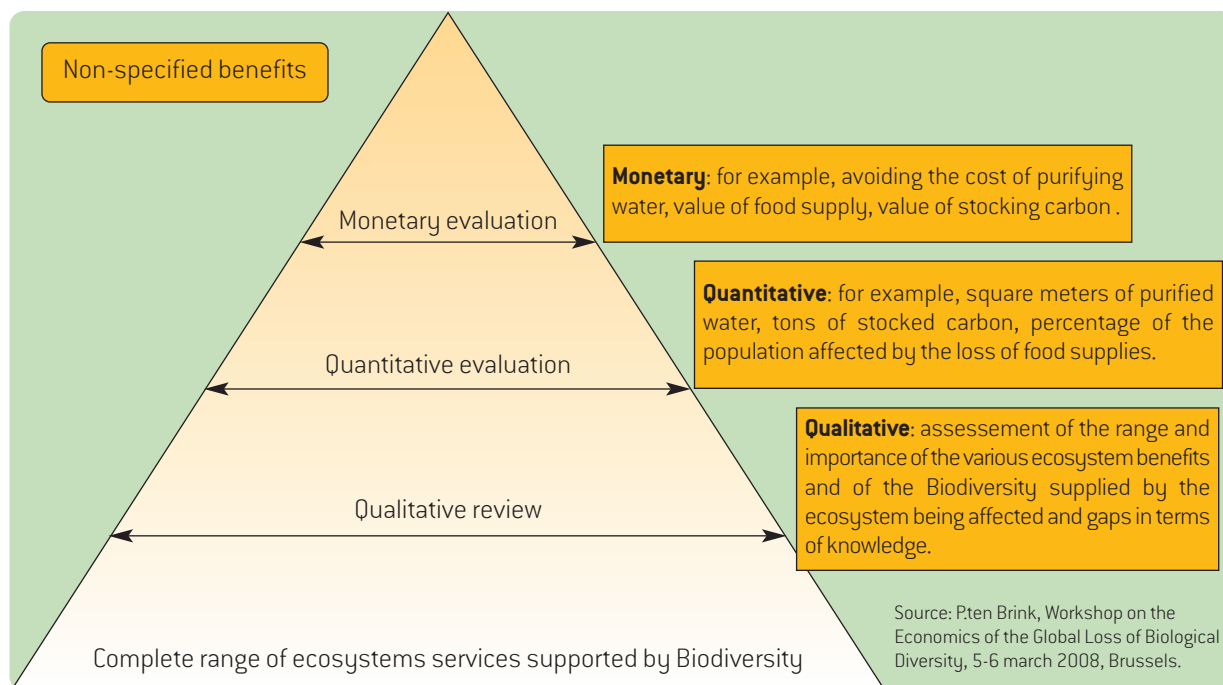
As was demonstrated in the Millennium Ecosystem Assessment (MA 2005), the impact of cumulative pressure on ecosystems may not be felt for years, up to the point of no return, causing abrupt and nonlinear changes.

Biodiversity is greatly affected by economic policies, or the lack thereof. Since no markets exist for the majority of the “public goods and services” deriving from Biodiversity, private reinvestment for the maintenance and conservation of such resources is practically nonexistent, and often the polluter does not pay for the damage caused. Moreover, whereas the advantage of the conservation of a species for future generations is global, costs for preserving a species are only local and are not compensated. Conservation, then, has a cost that should be included in the decision-making process. Knowing

“ Strategic objective 3:
By the year 2020 integrate Biodiversity conservation into sectoral and economic policies, also in terms of new employment opportunities and social development, reinforcing the understanding of benefits of ecosystem services that originate from it and the awareness of the cost of losing them. ”

these costs means having the basis to define the existing relationship between costs and benefits and to identify those conservation options that are most economically advantageous.

Once the value linked to ecosystem services has been assessed, innovative economic mechanisms suitable for managing and financing activities connected to Biodiversity conservation should be identified.



Biodiversity Strategy

An economic mechanism can be considered suitable when it is:

- **environmentally consistent;**
- **socially accepted;**
- **financially feasible.**

The international community is working on identifying innovative instruments that possess these three requirements and that can demonstrate effective usefulness within this framework.

In 2007, at a meeting held in Potsdam, Germany, the Environment Ministers of governments who are members of the G8 +5 agreed to start the “process of examining the global economic benefit resulting from biological diversity and the cost of losing Biodiversity.” An important scientific initiative emerged, the TEEB 5 (The Economics of Ecosystems and Biodiversity), within which a series of reports were prepared in order to respond to the needs of different groups of principal users (decision makers on a national and local level, companies, and the public at large) needing an economic assessment of ecosystem services.

Tropical Forests	Value of Ecosystem Services (in US - values as of 2007)		
	AVERAGE	MAXIMUM	NUMBER OF STUDIES
Ecosystem Services			
Provisioning Services			
Food	75	552	19
Water	143	411	3
Raw Materials	431	1418	26
Genetic Resources	483	1756	4
Medicine Resources	181	562	4
Regulatory Services			
Improvement of air quality	230	449	2
Climate regulation	1965	3218	10
Water flow regulation	1360	5235	6
Waste treatment/purification of water	177	506	6
Erosion prevention	694	1084	9
Cultural Services			
Opportunities for leisure and tourism	381	1171	20
Total	6120	16362	109

Example of economic assessment of ecosystem services of the tropical forest (from TEEB (2009) TEEB Climate Issues Update, Settembre 2009).

Assessing the economic value of goods and services connected to a high degree of Biodiversity is complicated by the fact that not only use values exist (direct and indirect, such as, for example, protecting natural habitats), but also values that are independent of use (for example, benefits stemming from the awareness that others will be able to benefit from the same resource in the future). While for use values “market” approaches can be used, non-use values require different methodologies of evaluation depending on their purpose. (Carraro, Protecta 2010).

Use value and non-use value of Biodiversity and relative evaluation methods			
TOTAL ECONOMIC VALUE (TEV)	USE VALUE (UV)	Direct Use Value (DUV)	Benefits for recreation Methods: cost of trip Contingent evaluation
		Indirect Use Value (IUV)	Benefits for ecosystem functions Methods: production functions
		Option Value (OV)	Possibility of keeping availability of the good constant Methods: contingent evaluation
	NON-USE VALUE (NUV)	Legacy Value (LV)	Legal benefits Conservation of habitats for the future generations Methods: contingent evaluation
		Existence Value (EV)	Benefits of existence Methods: contingent evaluation

OECD 2003

Experience gained in recent years on a national and regional level has clarified without a doubt that the factors affecting the function of ecosystems are such as to render a purely conservationist approach to Biodiversity insufficient: in order to promote biodiversity conservation and ensure ecosystem services which come from it for future generations, it will be necessary to also take into consideration social, cultural and economic factors. It is not possible to come up with a priority scale for actions to implement the Strategy because programs and initiatives aimed at increasing knowledge of the consistency, distribution, characteristics and conservation status of habitats and species, action concerning improvement and restoration of ecological functionality of agriculture and forest areas, protection of the marine environment, and promotion of sustainable tourism are all, for example, equally important.

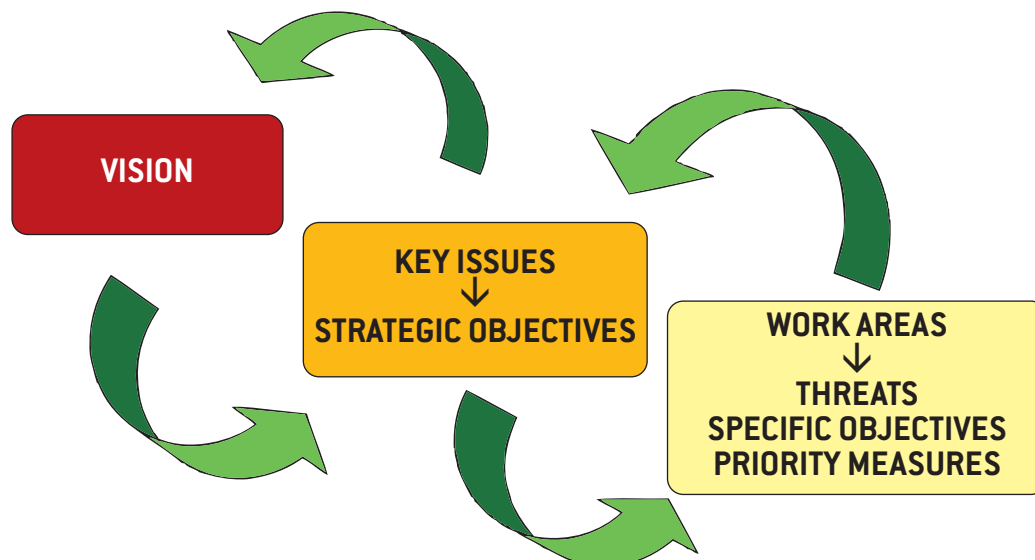
It is by no coincidence that the Strategy deals with the attainment of the three strategic objectives with 15 “Work Areas”. Analysis conducted in each work area aims at making the most of the contribution that can come from every single policy sector in order to achieve the three strategic objectives and, more in general, the Strategy vision.

Each Work Area is structured by:

- identifying main **threats and/or criticalities**;
- identifying **specific objectives to counter such threats**;
- **priority measures** to be undertaken.

Work Areas
1 Species, Habitats and Landscape
2 Protected Areas
3 Genetic Resources
4 Agriculture
5 Forests
6 Inland Waters
7 Marine Environment
8 Infrastructures and Transportation
9 Urban Areas
10 Health
11 Energy
12 Tourism
13 Research and Innovation
14 Education, Information, Communication and Participation
15 Italy and Global Biodiversity

There is no priority of action in the different sectoral policies, rather a synergy that produces the best result possible now that the indiscriminate use of the natural capital is perceived as the primary limiting factor of economic development, and that there is more recognition of the economic value of biodiversity and ecosystems.



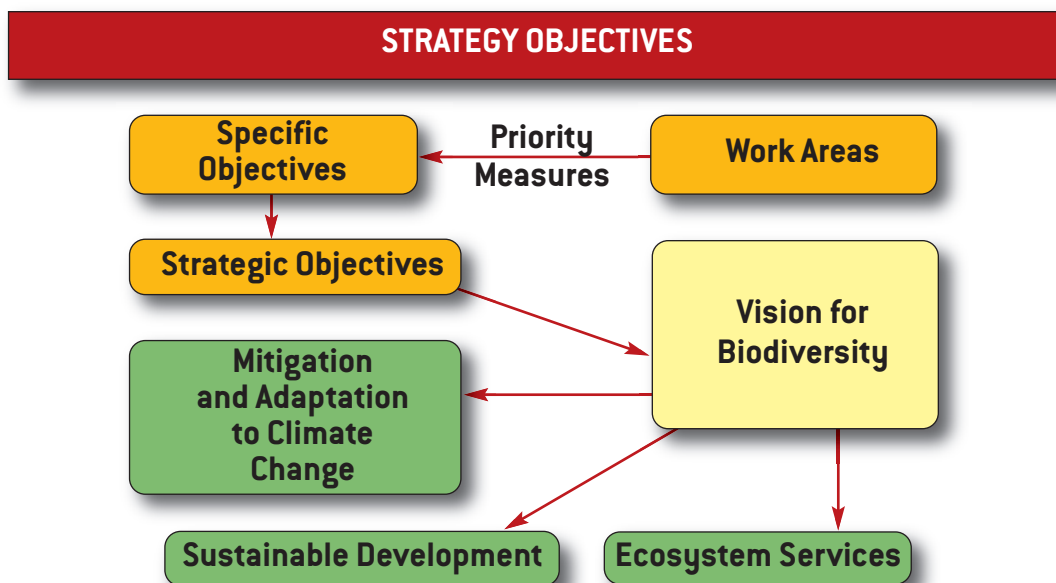
Biodiversity Strategy

Implementation of the National Biodiversity Strategy requires collaboration between policy makers and central and regional administrations that collect requests from all stakeholders with the support of the academic and scientific world.

The entire process of defining the Strategy has already experienced strong participation and sharing, and has become a mechanism that will allow for an effective response to the conservation commitment and

sustainable use of Biodiversity between 2011 and 2020.

The key that will allow carrying out this correct approach in implementing the Strategy is the governance that will involve the collaboration between the Ministry for the Environment, other Ministries responsible for different policy sectors, and the Regions, which have a fundamental role in managing the territory and which apply the guidelines provided for by the Strategy.



Studies carried out up to today on our natural heritage emphasize the huge responsibility Italy has on a European level: thanks to its physical, geographic and historical features, our country contains a high Biodiversity value at all levels, from genetic ones to the ecosystem and landscape ones.

Thanks to its position running from north to south, like a natural bridge between Europe and Africa, and in the center of the Mediterranean sea, Italy plays an ecologically important role at a European level for the conservation of numerous migratory species.



The species is the basic unit of each classification system of animal and plant organisms. Subjects belonging to the same species are distinguished not only by morphological similarities, but primarily by the fact that they represent an isolated unit from a reproduction point of view and have, therefore, a common genetic heritage. Each species groups subjects that have similar characteristics and that are capable of reproduction and produce offspring capable of breeding.



PRINCIPAL THREATS

- the generalized process of **loss of soil and change of its intended use** as well as habitat loss, modification and fragmentation;
- different types of **pollution** of land, water and air: it is an alteration of the ecosystem which compromises the ecological functions of the environment, often irreversibly, with both local and long-distance consequences;
- **climate changes** that occur through complex interactions, the extent of which is difficult to completely assess, able to change both the structure of habitats and their ecological functions, which have negative effects above all on migratory species and mountain environments;
- the **invasion of alien species**, which currently represents an environmental emergency in view of the negative effects on Biodiversity and on ecological processes, economic damage to numerous man-made activities and significant health-related problems caused by this phenomenon;
- **pressures stemming from hunting**, which is practiced in over 83% of the national territory, and **poaching**;
- the construction of particular **infrastructures** (for example, MV/HV power lines, wind farms, lighting installations) in sensitive areas and without the technical measures necessary to mitigate the effects, represents a real threat to the conservation of certain species;
- the **simplification and loss of a landscape identity**, with the resulting removal, alteration and fragmentation of habitats and of communities associated with them, and reduction of its social, aesthetic and recreational role.

Knowing for protecting

Since the end of the 1990's, the Directorate for the Protection of Nature of the Ministry for the Environment has been collecting and systemizing different studies on flora, fauna and vegetation, which were conducted on the national territory in order to become familiar with, substantiate and protect Italian Biodiversity both from a quantitative and a qualitative point of view.

Various projects were supported, resulting in, for example, the publication of the "Checklist of Italian Species and Fauna", that is a complete list of the animal species that live in our country, as well as the first "Checklist of Italian Vascular Flora" and, for marine environments, analogous reference lists for benthic pluricellular marine algae, coral and zooplankton.

Subsequently, different atlases were drawn up which, with respect to the checklists, provide important information concerning the distribution of species, such as "The Atlas of Amphibians and Reptiles", "The Atlas of Vascular Species Considered of Conservation Interest" and "The Atlas of the Migration of Birds (Passeriformes and non-Passeriformes) present in Italy".



SPECIFIC OBJECTIVES AND PRIORITY MEASURES

The Strategy stresses the need to develop and put in place policies for the conservation and restoration of species, habitats and landscape in the entire national territory. This can be achieved through joint action with State, regional and local government bodies. These policies must recognize the intrinsic value and significance, including economic, of the overall picture formed by ecosystems, which guarantee ecosystem services that are essential for us and which make up our landscape, representing an important national resource. Moreover, Biodiversity and ecosystems conservation objectives should be guaranteed through a plan that integrates protection, restoration and sustainable use of territorial elements, reduces fragmentation, and implements programs and action aimed at guaranteeing and recovering an adequate ecological connectivity.

“ *Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.*
 (The European Landscape Convention Article 1). ”

In the first place, it will be necessary to **broaden knowledge** on the substantial features, threat factors and the conservation status of species, habitats and the ecosystem services that they offer, as well as knowledge on the promotion of **monitoring** protocols throughout the national territory; in the second place, **incentivizing the sustainable use** of natural resources and implementing

“ *Habitat comes from the Latin “habitare” (to live), and is the entire whole of environmental conditions in which a particular species of animal or plant lives, or also the place where a single phase of the biological cycle of a species takes place.* ”

policies aimed at ensuring a satisfactory conservation status of habitats and species through, among other things, the creation of **conservation programs**, and the improvement and restoration of habitats under greatest threat. It will be necessary to implement policies for improving the **sustainability of hunting**, the **reduction of poaching** and the **conservation of migratory** species, but also policies tailored to eliminating and/or mitigating man-made activity that causes climate change, while reducing its impact. Finally, it will be necessary to put programs in place that prevent the introduction of **invasive alien species**, as well as monitor them and, if necessary, eradicate them.

The impact of Biological Invasions

Alien plants and animals that settle into new habitats that are unusual for them can overwhelm the native flora and fauna and harm the environment. Such organisms are known as “invasive species” and are considered by the international scientific community to be the second greatest cause for the loss of Biodiversity on a global scale.

The majority of alien species were introduced intentionally, as is the case with trees and cultivation that are more resistant or that grow rapidly, ornamental garden plants, or animals kept as pets. None of these species necessarily creates a problem as long as they do not get out of control and are not introduced into the natural environment. Other undesired species have arrived by chance, such as “stowaways” trapped in merchandise transported by air, or in shipping packaging, or, for example, transported by ships.

Their impact on local ecology includes:

- competition with native organisms for food and habitat or direct predation;
- structural changes of ecosystems;
- hybridization with native species;
- direct or indirect toxicity due to the introduction of parasites and pathogens.

Early identification and rapid response are the most economically advantageous solutions and are more likely to be successful than taking action when a species has already settled in. Therefore, information and research initiatives, such as the DAISIE, Delivering Alien Invasive Species Inventories for Europe, play an important role in developing timely alert systems to warn of alien invasive species.



Carpobrotus edulis an invasive species originating in Africa found frequently on our coastlines.

2 Protected Areas

Protected areas, following extensive territorial distribution, have carried out and still play a recognized strategic role in Biodiversity conservation in our country. They represent a fundamental and indispensable instrument for our Biodiversity conservation strategies and the ecological processes of the planet.

In recent years, Italy is the European country which has established the largest number of protected areas pursuant to the Framework Law on Protected Areas (Law no. 394/91) and to the Defense of the Sea Law (Law no. 979/82). In addition, there are the areas of the Natura 2000 Network, which comprise more than 20% of the national territory.

PRINCIPAL THREATS

- the **lack of a systematic, synergic, and strategic approach** in managing protected areas;
- the **lack of** and/or the inconsistent availability of socio-economic and **naturalistic knowledge** to use as points of reference for operational and managerial choices;
- the **inadequate perception of the opportunities for economic and social development** the protected areas offer, and the prevalent attitude to only emphasize obligations and prohibitions;
- **slowness in approving planning** and socio-economic development tools;
- delays in establishing and implementing management of protected marine area systems;
- the **lack of shared models** for environmental and economic verification of management efficacy and efficiency of single protected areas;
- **insufficient professional training** of personnel in protected areas;
- the **lack of professional technical figures** with strong experience in the sector who are in management bodies, which has inevitable consequences on reaching adequate conservation and sustainable development objectives;
- the **scarcity of financing** both at a State and regional level, and the inconsistent and often in efficient use of available funds with regard to the conservation objectives handed down from national regulations.

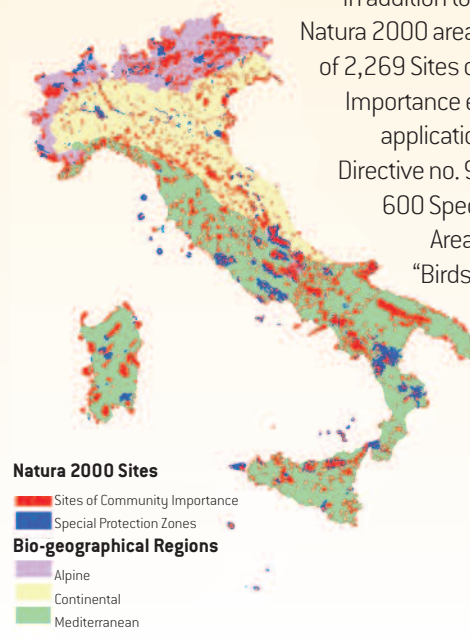
Protected Areas and the Natura 2000 sites are key to the construction of Ecological Networks in the national territory.

According to the 6th Update of the Official List of Protected Areas, 867 protected areas in Italy were designated for a total of 3,140,798 hectares of land, and 2,830,803 hectares of sea, corresponding to 10.42% of the national territory.

With respect to protected marine areas, regulatory provisions have identified a total of 52 designated areas whose protection is considered a priority: in 32 of these areas, protection measures are already in place, consisting of 27 marine reserves, 2 national parks with extensions to the sea, 2 underwater archeological parks and the great international Sanctuary for the safeguarding of marine mammals.



In addition to these are the Natura 2000 areas, comprised of 2,269 Sites of Community Importance established in application of "Habitat" Directive no. 92/43/EC and 600 Special Protection Areas pursuant to "Birds" Directive no. 79/409/EC.



SPECIFIC OBJECTIVES AND PRIORITY MEASURES

The Strategy emphasizes the need to **give impetus to the management of protected areas** in order to create synergies, encouraging their ecological connectivity, as an essential instrument for the continuity of ecosystem services (Ecological Networks).

In order to verify the efficiency of how protected areas are being managed, it is of the utmost importance to identify a common set of indicators that have been discussed and shared, which allow for monitoring and measuring of their progress and criticality. The Strategy, moreover, requires bridging the gap between the delay in the introduction and the implementation of the management of the protected marine areas. The Strategy also requires quickly obtaining approval for planning, management and socio-economic development mechanisms, which also make the protected areas focal points of the research and monitoring networks of the territory for Biodiversity, and prime centers of collaboration with the research world. The Strategy emphasizes the importance of implementing:

- **conservation** projects on species, habitats, ecological processes and ecosystem services;
- programs of **awareness raising, information and**

“ *An ecological network is a group of intervention strategies aimed at the recovery of the territory and its characteristic natural processes. It represents a new approach for the protection of nature, based on the concept of biodiversity, aiming at safeguarding and enhancing biological diversity, fundamental for the survival of the ecosystems, within a continuous, diffused and global network and not limited solely to “green islands”. It is a fundamental tool both from a technical and political point of view for territorial planning and for increasing the quality of the territory, in order to create new balance between natural areas and anthropogenic contexts.* **”**

- **education** on the theme of Biodiversity and its conservation;
 - programs for **training personnel** working in protected areas;
 - programs for **sharing knowledge and best practices**.
- Of course, all of this cannot be implemented without adequate financial support.



3

Genetic Resources

Despite their key role in agriculture, forestry and industry sectors, little is still known about genetic resources, and there is no clear understanding of which ones are of greater significance, what their value for the economy and for biological balance is, and their state of conservation, which ensures their use also for generations to come.

The CBD considers having access to genetic resources, their sustainable use and the benefit-sharing deriving from them, as one of its main challenges on a global level because many different economic and policy interests become involved on both an international and local level.

PRINCIPAL THREATS

- **the distribution and/or fragmentation of territory**, which limits or prevents the spread of genes among populations (gene flow) also with regard to the residual size of natural populations;
- **invasive alien species**;
- **pollution**;
- **anthropogenic pressures**;
- **excessive hunting** of spontaneous species and wild populations;
- **the escape of bred alien organisms**;
- **the uncontrolled presence of genetically modified organisms (GMO)**.

These threats can lead to:

- **the extinction of species and genetic erosion** within species;
- **genetic pollution**, also due to the introduction and spread of alien species and GMOs.

Genetic Diversity

Genetic diversity refers to the variability of the genetic heritage within a single species and includes genetic variations between distinct populations of the same species and genetic variations within the same population. It is a fundamental part of biological diversity, thanks to which, in the course of natural evolution, a grouping of species and natural communities has developed and will continue to develop through processes of natural selection and adaptation to changes in the surrounding environment.

Genetic diversity not only involves single individuals, but it characterizes groups of individuals having particularly similar characteristics within the same species (populations). Populations belonging to the same species share the same gene pool, and they are more or less isolated from each other usually due to geographic barriers. If populations responsible for the majority of variability go extinct, natural selection has less quantity of genetic variation to work with and, consequently, chances for survival of the species may be reduced. The loss of genetic variability in a species is called “genetic erosion”.



Conservation of ancient horticulture varieties: ancient cultivars of beans (*Phaseolus vulgaris*) from Liguria. From left to right: Bianco di Conio, Bianco di Pigna, De Milan, Reale di Triora, Gianetto di Alberga, Mascherin and Bianco di Badalucco (Grassi *et al.*, 2005).

SPECIFIC OBJECTIVES AND PRIORITY MEASURES

The National Biodiversity Strategy recognizes among its priority measures the **promotion of knowledge** of the national and international heritage of genetic resources (nature, distribution, state of conservation), and the need to increase awareness of the **opportunities stemming from their sustainable use** and the **risks** connected to genetic erosion and pollution through information programs, communication and awareness raising. Moreover, in order to prevent genetic erosion it will be necessary to:

- **incentivize** the contribution of Botanical Gardens, Germplasm Banks, Zoos and Aquariums for **in situ and ex-situ conservation** and for the recovery of Biodiversity, and implement programs and measures for the conservation of particularly endangered species.
- **safeguard ancestral species of crops and zootechnical varieties** which risk extinction or genetic pollution;
- **prevent genetic pollution of the wild** in the breeding of terrestrial and marine animal species and in repopulation;
- **mitigate the genetic impact of non indigenous species.**

Access and Benefit Sharing (ABS)


The CBD's third objective is to ensure that all contracting countries attain "appropriate access to genetic resources and an appropriate transfer of relevant technologies, taking into account all rights over those resources and technologies, and by appropriate funding", (from article 1 of the Convention). Countries in the northern part of the world are particularly interested in being provided genetic resources, whereas southern countries, through the transfer of technologies and knowhow, must be made capable to manage and develop their genetic heritage. ABS (*Access and Benefit Sharing*) was a focal point of the work of the tenth Conference of the Parties of the CBD, at the end of which the *Nagoya Protocol on ABS* was approved, which regulates access and the sharing of benefits arising from genetic natural resources (the most famous example is the one involving the pharmaceutical companies that extract medicines from plants that are the natural heritage of the poorest countries, which happen to have the richest Biodiversity) and provides for combating bio-piracy, which consists in patenting substances already known and used by local populations because they were always part of their traditional knowledge. As of today, 42 countries have signed on, including Italy, which joined the Protocol on June 23, 2011, along with the European Union and 11 of its Member States. The Protocol will enter into force 90 days after the fiftieth instrument of ratification, acceptance, approval or accession has been deposited. Its formal entry into force will be prepared by an Intergovernmental Committee set up for this purpose. The Committee plans to meet twice, the first meeting in Montreal from June 5 – 10, 2011 and the second in Delhi, India, from April 9 – 13, 2012.


The Italian Network of Germplasm Banks

Numerous plant species in the world have recently become extinct and many are under threat. To reduce the loss of genetic diversity, they can be preserved in two ways:

- insofar as is possible, an *in-situ* conservation should be enacted, keeping plant species in their natural habitat.
- as prevention, or where *in-situ* conservation is no longer possible, *ex-situ* conservation should be enacted; seeds or other propagation organs of the plant species are collected and preserved in seed banks, or the plant species are cultivated outside of their natural habitat;

Seed banks are specialized structures which operate according to international standards. In Italy, the Italian Network of Germplasm Banks (RIBES) has been very active. It operates in 10 Regions for the preservation of spontaneous Italian species.





Biodiversity in species both wild and domestic, or cultivated and bred, represents the basis of agriculture, allowing for the production of food, and contributing to the health and nutrition of the entire world population.

In the past, the same genetic resources have allowed for the improvement of cultivated and bred species, and they will continue to carry out this function in the future. This variability will also allow to respond to the evolution of agricultural products and to adapt to changing climate and environmental conditions.



The CBD describes **agricultural Biodiversity** as *all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agro-ecosystem: the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes.*



PRINCIPAL THREATS

- the general **decline of agricultural Biodiversity** in all its aspects, starting from the abandonment of traditional agricultural practices to the loss of native animal or plant species, and to the standardization of cultures with the selection of extensively cultivated varieties to respond to market demands;
- **soil erosion**, the loss of organic matter and soil Biodiversity, desertification;
- **conflicts over decisions about land use** linked to the increase of agricultural production resulting in the interruption of the environmental *continuum* and ecological connectivity;
- the utilization of **non sustainable agricultural techniques**;
- **the introduction of species** or of **other alien genetic material** and the subsequent hybridization due to different causes (biological or integrated control, improvement of breeds or varieties, increase of productivity, etc.);
- **pollution** caused by the use of chemical products utilized in common farming practices, or by other polluting sources;
- **the transfer of parasites or diseases** from agricultural areas to wilderness areas;
- the effects of **climate change**, which may amplify regional differences and exacerbate the economic disparities between rural areas.

Sustainable Agriculture

The natural Italian landscape, which has always been shaped by agricultural activities, still today maintains a rich variety of valuable, unique, semi-natural habitats where elements of Biodiversity are present, including species that risk extinction, and that are greatly threatened by the escalation of agriculture.

It is, therefore, of utmost importance to promote a sustainable type of agriculture that is not limited to producing foodstuffs but that is also:

- economically advantageous;
- respectful of the environment;
- socially correct.

Farms should play a central role as well as farmers who, through the choice of management methods for agricultural practices, determine pressures that affect these environments. Also important is the identification and conservation of farming systems at high nature value (HNV), i.e. "... those areas in Europe where agriculture is a major (usually the dominant) land use and where agriculture sustains or is associated with either a high species and habitat diversity, or the presence of species of European conservation concern, or both." (Andersen et al. 2003).



SPECIFIC OBJECTIVES AND PRIORITY MEASURES

Agricultural policies and financial instruments for the management of agricultural resources are crucial for the management and conservation of Biodiversity. The Common Agricultural Policy (CAP), aimed also at achieving objectives regarding environmental protection and social and economic promotion, encourages **long-lasting and economically sustainable production models** that at the same time allow taking measures concerning the environment, and for the improvement and restoration of Biodiversity.


In view of this, it is important to:

- **encourage conservation and the sustainable use of agricultural Biodiversity** as well as the protection and circulation of agricultural and forest systems of high nature value (HNV) through the promotion of agricultural practices aimed at reducing Biodiversity loss, and the fostering of eco-compatibility (for example, biological agriculture) through the reduction of the use of synthetic chemicals.

The EU *Common Agricultural Policy* (CAP) ensures that agriculture and environmental protection continue at the same pace, contributes to the socioeconomic development of rural communities and plays an essential role in finding solutions to new challenges, such as climate change, the management of water resources, bio-energies and the protection of Biodiversity.

“ *Compared to other sectors of the production world, agriculture offers important practical and feasible opportunities to mitigate the effects and adapt to climate changes through the implementation of carbon sequestration and to improve soil resilience which is due, for the most part, to the presence of an edaphic community.* ”

- **maintain and, if necessary, recover ecosystem services** of the agricultural environment being damaged, favoring agricultural production systems that prevent the chemical, physical and biological degradation of soil and water;
- **promote the defense of the territory** through integrated policies that foster sustainable agriculture, avoiding the abandonment and/or the marginalization of agricultural areas to ensure that the farmers take on the role of custodians of their own lands;
- **promote the protection and enhancement of local and native species** and act in such a way as to prevent the risks connected to the introduction of genetically modified cultivation;
- **incentivize control, prevention and awareness raising of operators** in the agricultural sector concerning the damage caused by pesticides and the use of biological and integrated control techniques in agriculture.



Rete Rurale Nazionale
2007.2013

The National Rural Network is the program through which Italy participates in the wider European project (Rete Rurale Europea – RRE - European Network for Rural Development), which accompanies and complements activities connected to the development of rural areas from 2007 to 2013.

The program aims at supporting development policies for agricultural areas with the goal of encouraging an exchange of experience and knowledge between operators in the sector and institutions, and everyone who works and lives in rural areas. Activities carried out within the rural development policy managed in this program and the recent review of the **National Strategic Program** (PSN-Piano Strategico Nazionale) of Rural Development, identify Biodiversity, climate change and the protection of agricultural landscape as the objectives to be reinforced in the 2007-2013 plan period. The National Strategic Plan provides an official framework for the planning of agricultural and forestry measures; it is the reference strategic document concerning integration between agriculture and the environment and for the implementation of the National Biodiversity Strategy with regard to the Natura 2000 agricultural and forestry areas, high nature value areas and the protection of animal and plant genetic resources. Alongside this is the **National Plan for Agricultural Biodiversity** (NPAB), recently prepared by the Ministry for Agricultural and Forestry Policies, which represents another important element for coordination on a national level of policies that foster safeguarding agricultural genetic resources.

Italian forests are characterized by wide diversity, facilitated by the environmental heterogeneity of our country (bio-geographical, bioclimatic, geomorphological and pedological). Italian forests presently cover nearly 35% of the national territory, a percentage which is progressively increasing (INFC 2005).

The majority of Italian forests are represented by simplified systems from a structural point of view (for example coppes, high forests with native species having a simplified structure and/or composition, with artificial populations of native species).

Extremely rare and, in fact, little known, are the patches of

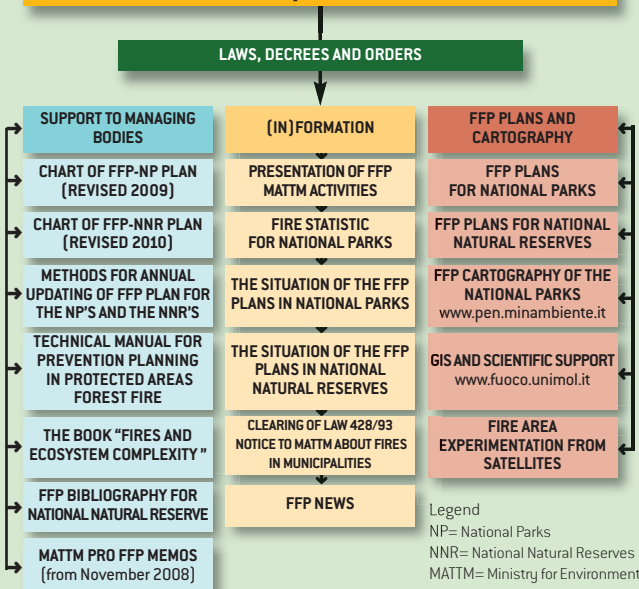
forest that, although used in the past, have developed features of “ancientness” following a sufficiently long period of the absence of man-made disturbances.

These are considered hot spots for Biodiversity conservation, ensuring a habitat suitable for the preservation of rich and diverse edaphic communities. Even urban forests, while making up a small percentage of Italian forests, are unique reservoirs of flora and fauna Biodiversity. In the same way, forest formations associated with agricultural cultivation in the specificity of their role, are natural niches of particular value in terms of conservation of biological diversity.

PRINCIPAL THREATS

- the increasing number of **wildfires**, almost all due to arson, recently made worse by the abandonment of about half of Italian forests and by the effects of climate change;
- an increase in **plant pathologies**;
- the **fragmentation of some types of forestry habitats**, especially coastal;
- the expansion of some types of **invasive alien forest species** at the expense of natural forests;
- **difficulties in enhancing non-monetary services** provided by forest resources, such as the protection of ecosystems, hydrogeology and landscapes, as well as carbon capture and storage and aesthetic/recreational services;
- the **absence of univocal monitoring programs** of forest Biodiversity;
- the **inadequacy of planning and management tools**;
- the **lack of synergy** between forest planning and other territorial planning tools;
- **insufficient integration** of Biodiversity needs when planning and managing forest ecosystems.

Forest fire prevention (FFP) in national protected areas



Forest Fires

In Italy, as in other Mediterranean countries, one of the main threats to forest resources and their biological diversity are fires. Almost all fires are due to arson, and are tied to the growing phenomenon of abandoning the management of forests, and to climate changes. According to experts, the increase in average temperatures and the decrease in precipitation, especially during the summer, risk increasing the frequency and the severity of fires. The consequence is undisputable environmental damage that results in the loss of biological diversity of the soil, decreased resiliency, and a loss of a large part of ecosystem services provided by forests.



SPECIFIC OBJECTIVES AND PRIORITY MEASURES

Apart from supplying wood and other secondary products, forests carry out an array of essential **ecosystem services**. It would, therefore, be wise to:

- foster the **restoration and maintenance of the ecosystem services** of forest formations, with particular regard to hydrogeological defense, river management and the maintenance of their quantity and quality;
- **increase the input of forest environments on the carbon cycle**, thereby contributing to the mitigation of climate change;
- raise public and governmental awareness at all national levels concerning the opportunities to **enhance the non-monetary services offered by forest resources** through the best communication tools available.

In order to safeguard territorial integrity, the surface, the structure and the state of health of the national forest heritage, it will be necessary to implement **sustainable forest management** principles, recovering the forest potential that has been damaged by climatic events, plant pathologies and fires and using native species even though not rapid growing.

For sustainable forest management purposes, the following will be useful:

- the development of **monitoring programs** to monitor the state of preservation of forests so that early detection of potential problems is possible;

- the inclusion of the protection of landscape, biological diversity and complexity in all levels of **forest planning**;
- the adoption of **forest production systems** capable of preventing the physical, chemical and biological degradation of forest soil.

The Strategy recognizes the importance of fully implementing the provisions of the Framework Program for the Forestry Sector, of promoting interdisciplinary research projects that evaluate the multifunctional aspects of sustainable management of forest systems, to maintain a high level of Biodiversity, to better understand the impact of climate change, to counter the degradation of forest ecosystems and to foster the well-being of local communities. Priority should be given to encouraging the inclusion of Biodiversity protection in all levels of forest planning, with particular reference to management plans of protected areas, to conservation measures, to the management plans of Natura 2000 sites with a strong component of forest habitats and the use of the National Register of Agro-Forest Carbon Sinks as a basic inventory system of the forest resources of our country; the latter should be continuously updated and enriched with new functionalities specifically dedicated to monitoring forest Biodiversity, as well as a tool for calculating how much the Italian agro-forest systems can contribute to the absorption of greenhouse gases.

National Inventory of Forests and Forestry Carbon Sinks (INFC)

The INFC is an operative program, implemented by the State Forestry Department, in which investigations are carried out in order to understand the extent and the quality of national forest resources: the forest area and the areas of various types of forests, the state of health, the biomass and the quantity of carbon stored, the pace of growth, production capacity, etc. are among the principal results of each inventorial investigation. Forestry inventories are also important mechanisms for monitoring the status of the natural environment..



Inland water ecosystems only cover 0.8% of the Earth's surface, but contain 10% of all animal species, including more than 35% of vertebrates. They are the most exploited national resource: continuous and intense anthropogenic pressures, including pollution from production and the increase in the level of fishing

through new concessions, resulted in significant impact with negative effects on the ecosystem services provided by aquatic biocenosis, such as purification processes or the fixation of carbon emitted into the atmosphere annually, thereby mitigating the effects of climate change.

PRINCIPAL THREATS

- **morphological and physical alteration** due to river channeling, the construction of water infrastructures, dams and dykes, dredging operations, soil use change and urbanization of perfluvial and lake areas;
- the **loss and degradation of habitats** due to demographic growth and an increase in the use of water resources;
- **the non sustainable use of water resources** with a growing and uncontrolled use of fresh water for human use and for production activities, (agriculture, industry, hydroelectric sector, water cultivation, etc.);
- **pollution** due to excessive loading of pollutants and nutrients;
- accidental or intentional **introduction of invasive alien species** in aquaculture or for biological control causing competition for native species, alteration of nutrient cycles and productivity and loss of genetic integrity;
- impact of **climate change** affecting the entire hydrological cycle with obvious consequences on coastland wetlands, including sea level rise, increase in salinity, changes in water regimes and sediment transportation.

The Water Framework Directive (2000/60/EC)

The Directive establishes a framework for Community action with regard to water, and introduces an innovative approach in European legislation concerning water policy from both an environmental and an administrative/managerial point of view. The Directive pursues ambitious objectives: **preventing the deterioration of water quality and quantity, improving the status of water and ensuring its sustainable use** based on the long-term protection of available water resources.

The Directive establishes that each Member State shall deal with the protection at a “**river basin**” level. The territorial reference unit for the management of the basin is the “**river basin district**”, an area of land and sea, made up of one or more neighboring river basins and the respective surface and ground waters. Each district must have a plan of action that takes into consideration the environmental objectives set out by the Directive, with the final goal being the achievement of a “good status” of all waters by the year 2015. Measurement programs are indicated in the **Management Plans** that Member States must draw up for every single river basin and which represent the planning/implementation tool to reach the objectives established in the Directive.

In Italy, Directive 2000/60/EC was incorporated through **legislative decree no. 152 of April 3, 2006**. Article 64 of said legislative decree divides the national territory into **8 river basin districts**.



SPECIFIC OBJECTIVES AND PRIORITY MEASURES

The unsustainable management of water resources, the increase in demand, and the alteration of hydrological regimes, caused also by climate changes, but above all by the irrational use of water resources, are reducing and deteriorating water resources and are bringing about the collapse of aquatic ecosystems, so much so that species living in inland waters are at greater risk, with extinction rates approximately six times higher than those of marine or land species.

In order to effectively take action on these threats, the National Biodiversity Strategy intends to:

- **protect and conserve inland water ecosystems** at river basin scale, countering the degradation and the loss of Biodiversity and, where possible, fostering restoration. One of the most important steps in reaching this goal is to reduce the incidence of pollution sources and the prohibition to introduce invasive alien species into water bodies;
- **ensure that the needs of Biodiversity Conservation** of inland water ecosystems and the relative ecosystem services are included in sector and economic policies, reinforcing the understanding of the benefits that derive from them and the cost of losing them by, for example, promoting information initiatives on the value of water

resources, on the right of access and on the need to save water;

- **ensure the sustainable use of water systems** (water, sediment, biota), through measures aimed at improving the efficient use of water resources and the re-use of purified wastewater, promoting projects aimed at defining the best technological practices for the processing of drinking water and for the elimination of excessive natural pollutants, improving the use of water resources and checking for unlawful uptake and dispersions due to the malfunctioning of the distribution network;
- **improve knowledge of the status of water systems** by optimizing, for example, the meteo-hydro-pluviometric and freaticmic monitoring networks not only for management of hydro-geological, hydraulic and drought risks, but also in order to evaluate the availability of surface and ground water resources;
- **support fishing tourism sectors** and in particular fish-related **tourism**, that promote, in addition to recreational and cultural purposes, the correct use of water ecosystems and fish resources through, for example, the creation of inter-regional networks of areas involved in such activities.

The Protection of Wetlands

Wetlands are environments of high ecological diversity, characterized by a considerable environmental fragility and by species and habitats that are often under great threat. On a European level, the Water Framework Directive (WFD) is integrated together with the Habitats and Birds Directive in order to protect or restore connections between aquatic habitats in/between Natura 2000 sites and Protected Areas. The WFD regulates that in these areas:

- 1) protection objectives set out by the three Directives (article 4.1, c WFD) must be reached, i.e. a “favourable” conservation status for the species and habitats, as well as the ecological status [an expression of the quality of the structure and functioning of aquatic ecosystems associated with surface waters; evaluations must be conducted through measuring the variance of elements of biological quality of the surface water body with respect to the absence of any changes of an anthropogenic origin] «good» [basic unit for the management of water according to the WFD] for water bodies by the year 2015;
- 2) integrated monitoring is conducted, in compliance with the provisions of the three Directives (article 8.1 WFD);
- 3) integrated and coordinated management measures are implemented, necessary to achieve the objectives under point 1) included in the River Basin Management Plan (article 13 WFD) and in the Management Plans for Natura 2000 Sites and Protected Areas.

(D’Antoni, Bonci: Protecta, no. 11, 2010)



According to the UNEP/MAP dossier on the status of the health of Mediterranean coasts, the population in Mediterranean coastal cities will rise from the 70 million registered in 2000 to 90 million by the year 2025.

In terms of linear density, the number has increased by threefold in the last half century, whereas the number of coastal cities has almost doubled since the last half of the century. Added to this demographic increase is a significant flow of tourists.

Marine ecosystems, already under stress from man-made activity on the coasts, pollution and overfishing, undergo the effects of rising temperatures and acidification due to climate change and the increase of CO₂, resulting in changes in terms of the reproduction and



pup of *Caretta Caretta*

abundance of species, the distribution of marine organisms and the composition of plankton communities.

PRINCIPAL THREATS

- **Pollution** coming from the mainland, more specifically: the eutrophication and pollution by hazardous substances and nutrients from agriculture, dumping of industrial waste, discharge of waste connected to tourism and growing urbanization caused by increasing population density;
- **fishing** and the general excessive exploitation of biological marine resources by national and international vessels and, above all, due to illegal, undeclared, and unregulated fishing;
- the voluntary or involuntary introduction of **invasive alien species** through ship ballast water, hull fouling, the import of pathogenic non-indigenous species and agents;
- commercial and pleasure **maritime traffic**;
- **the physical alteration of coastal habitats**;
- **climate change**.

These threats lead to significant loss or degradation of Biodiversity, changes in its structure through contamination and destruction of species, habitats and ecosystems.

The consequences can be seen in severe damage to fishing stocks, plankton, and benthic communities, to the fishing and aquaculture economy, to landscape and natural resources on which tourism is based. The most alarming aspect is that these negative pressures, despite environmental policies implemented in recent years, are still growing steadily and have already reached a level that can rapidly lead to a large-scale systemic crisis.



The Island of Capraia, the Tremiti Islands

SPECIFIC OBJECTIVES AND PRIORITY MEASURES

As can be seen, there is a strong connection between all of the threats, and they necessitate tools that are able to ensure an effective **integrated sea and coastal policy**. A first step in this direction could be the ratification and application of the Protocol for the Integrated Coastal Zone Management (ICZM) of the Barcelona Convention for the Protection of Marine Environment and the Coastal Region of the Mediterranean, adopted in Madrid on January 18, 2008.

It is, therefore, necessary to tackle and resolve the two main problems concerning **correct governance of the marine-coastal environment** on a national and international level:

- the sectorialization and lack of communication between the various policy sectors and the absence of territorial planning tools, both national and international, leading to the fragmentation of action and the overlapping of means, resources and objectives;

“For the preservation of marine resources, the European Commission has worked to draft a horizontal and intersectoral *Integrated Maritime Policy* that encompasses all the aspects of our interaction with oceans and seas, encouraging sustainable exploitation of them and at the same time promoting the development of maritime sectors and coastal regions.”

In 1970, the European Commission launched the *Common Fisheries Policy* (CFP) whose objective is to protect fishing stocks from excessive exploitation, to ensure an income for fishermen, to ensure that customers and the processing industry are supplied on a regular basis at reasonable prices and the sustainable exploitation of living aquatic resources from a biological, environmental and economic point of view.

- the planning, organization and regulation of activities concerning the high sea marine environment, which have a considerable direct effect on territorial waters and on the coasts.

For this purpose, a useful instrument could be the provision for **transposition of Directive 2008/56** (the marine strategy framework Directive) that provides for the drawing up of specific strategies for the marine environment. Thanks to this instrument, the marine-

coastal environment can be better protected and preserved, and the integration of conservation needs of marine and coastal Biodiversity, and the related ecosystem services, in economic and sectoral policies can be guaranteed.

It will also be necessary to ensure the **sustainable use of resources of the marine-coastal environment** through, for example, the **adjustment of fishing policies** with the full application of EEC Regulation no. 1967/2006, that deals with the management of Mediterranean fisheries and aquaculture, to ensure the maintenance of ecosystem services on which they depend, through the achievement of a satisfactory ecological status.

Through promoting specially dedicated programs and initiatives, **cognitive gaps must be filled** concerning the consistency, characteristics,

and status of conservation of marine habitats and species as well as the marine environment in general, including gaps concerning direct and indirect threat factors. Lastly, it will be of the utmost importance to foster the creation of a **network of protected marine areas in the Mediterranean**, ecologically representative and effectively managed, that can be monitored with standardized methods to assess the effects in terms of effectiveness in protecting Biodiversity and the reinforcement of ecosystem services.



8 Infrastructures and Transportation

The transport sector plays an essential strategic role for the economic development of Italy, but it is one of the economic sectors that exerts the most pressure on environmental and natural resources.

The demand for transportation in Italy has increased rapidly in the last ten years and is estimated to continue to grow in the next decade; it is, therefore, necessary to formulate and implement policies for controlling and mitigating the environmental externalities attributable to transportation.

The infrastructure network is constantly developing in both Italy and Europe, and consequently motorization is also growing rapidly; it is estimated that by 2025 the rate will be between 161% - 198% higher than in 1993.

The impact that an infrastructure has on Biodiversity changes in relation to the distribution of the habitats, to

the presence, distribution and biology of the species, the impact on fundamental ecological processes for the viability of the habitats themselves and the populations of the various species.

An evaluation of the impact that works have on ecosystems must also take into consideration aspects concerning impact on large areas (either direct or indirect), on biocenosis, and on individual species; in any case, such impact is difficult to evaluate both because of the complexity of ecological systems and the processes which regulate them, as well as of the limited knowledge available today in Italy concerning the operation of ecosystems and the trends of the populations of diverse species in relation to the fragmentation of territory.

PRINCIPAL THREATS

- the pressure from **infrastructures** on natural habitats and on animal populations;
- the development of **urban sprawl**, the rapid and disordered growth of metropolitan areas;
- **the utilization of natural areas** to accommodate new infrastructures;
- **atmospheric, acoustic and light pollution**;
- the **fragmentation of landscape** and the interruption of territorial ecological connectivity;
- an increase in the factors that determine **climate change**.

Green Infrastructures

The creation of green infrastructures will help reconnect existing natural areas, in addition to improving the ecological quality of the environment in general, rendering it more comfortable and suitable to natural life.

The potential components of a green infrastructure are:

- protected areas;
- healthy ecosystems and areas of high nature value outside of protected areas such as flood plains, wetlands, coastal areas, natural forests, etc.;
- landscape features such as small water courses, brush and bushes that can act as green corridors or stepping stones for wildlife;
- restored patches of habitat that have been created with specific species in mind, for example to help expand the size of a protected area, increase foraging, breeding and resting areas, and to facilitate the migration/dispersion of said species;
- artificial features such as eco-ducts or eco-bridges that are designed to assist the movement of species between insurmountable landscape barriers;
- multifunctional areas where methods of land use can be incentivized, which contribute to the conservation or restoration of rich, healthy Biodiversity ecosystems, favored over other activities incompatible with natural life;
- areas where steps can be taken to improve the general quality of ecology and the suitability of landscapes;
- urban features like green parks, green walls and roofs that host Biodiversity and that allow ecosystems to function and supply their services by creating links between urban, peri-urban and rural areas;
- elements that facilitate adaptation to climate changes and the reduction of the phenomenon of climate change itself, such as marshlands, alluvial forests and acid bogs (for the prevention of floods, for water storage and for CO₂ capture), that offer species space to react to changing climate conditions.



(from http://ec.europa.eu/environment/pubs/pdf/factsheets/green_infra/it.pdf)

SPECIFIC OBJECTIVES AND PRIORITY MEASURES

In order to reduce environmental pressure from the transport system, European policies have focused mainly on **technological innovation for vehicles and fuels**. These approaches, however, are not sufficient by themselves to ensure the reduction of greenhouse gas emissions in the sector, where, on the contrary, an intensification of pollution input was registered due to increased volumes of traffic.

More recently, the prevailing attitude in Europe is to try and maintain consistent growth in the transport sector and to improve its **modal split**, directing attention on **mobility policies**, which must foster the internalization of costs, voluntary agreements with industry, revitalizing rail networks and inland waterways, definition of objectives and goals, the best coordination of territorial planning and the use of strategic environmental assessment in support of infrastructure planning.

It will be necessary, also in Italy, to first of all **integrate mobility, infrastructure and transport policies into territorial planning**, in particular favoring the optimization of existing networks with respect to the implementation of large projects and by limiting non-anthropogenic land consumption by recovering, when possible, existing

The White Book on European transport policy
 "Transport 2050" is the White Book on the transport policy recently published by the European Commission, which, as the title suggests, represents a far reaching strategy that aims at creating a transport systems capable of increasing the mobility of passengers and merchandise, of removing the main obstacles in various sectors, of fueling growth and employment, as well as contributing to greatly reducing Europe's dependence on oil imports and reducing carbon dioxide emissions in transport by 60% by the year 2050. The main objectives of the plan are: banning traditionally fueled cars from cities, the use of 40% sustainable fuel with low carbon dioxide emissions in the aeronautic sector, and the reduction by at least 40% of maritime transport emissions.

infrastructures. When it is necessary to build new infrastructures, nature areas and habitats should be safeguarded through, for example, the building of **green infrastructures**, indentifying **solutions for mitigating impact**, by, for example, adopting naturalization and natural engineering methods and, should residual impact that cannot be mitigated be generated, take steps for environmental compensation.

Sustainable Mobility

The mobility of persons and goods is an essential instrument for economic and social activities. The need to adequately respond to an ever growing demand for mobility has led to a consistent increase in private transportation in the last decade, resulting in considerable environmental impact. Therefore, the need to implement sustainable mobility in a short period of time is a priority that is now recognized both on a national and on an international level. In view of this, initiatives of collective car use, such as car pooling and car sharing, are taking hold:

Car Pooling is a method of transportation that consists of sharing a private car between a group of people in order to reduce the cost of transportation. One or more of the people involved make their personal car available, sometimes alternating its usage, while the others contribute financially to cover part of the expenses the driver bears. This method of transportation is widespread in the workplace or at universities, where different people who travel the same route at the same time spontaneously agree to travel together.



Car Sharing is a service that complements local public transportation, and allows its users to access a common fleet of vehicles at a high technological and quantitative standard. This service is meant to encourage giving up the private car but not the flexibility of one's own mobility needs.



The majority of the world's population currently lives in urban areas; in Italy, 68.4% of the population lives in urban areas.

This imposing concentration of people puts great pressure on ecosystems and on natural resources in general. Soil sealing, discharges into water bodies, the release of toxic substances into the atmosphere, the production of waste, are all environmental pressures that essentially originate

in urbanized areas and that affect not only environments nearest those areas, but also on larger and more distant territorial areas. In the first case, the most evident effects regard health and, more in general, the quality of life of the urban population. In the second case, the impact affects natural resources, causing global effects such as the loss of Biodiversity, climate changes, and the deterioration of the environmental quality of water bodies.

PRINCIPAL THREATS

- **habitat loss and degradation** caused by physical alterations to the soil due to the presence of impermeable layers (population growth, particularly along the coast, along with the development of economic activities, environmental changes due to infrastructure and land use changes;
- the **lack of habitat continuity** in urban areas;
- the **disruption of wildlife corridors**;
- problems connected to **urban waste management**;
- the **heat island effect** with the consequent localized change of ecosystem conditions;
- an **increase in anthropogenic areas at the expense of natural areas**;
- the **introduction/release of non-native or incompatible species** with regard to the local or territorial environment;
- effects produced by the concentration of **pollutants linked to anthropogenic activities**.

The Rete delle Città, Urban Italia initiative (Network of Cities, Urban Italy)

The Community's Urban initiative, promoted by the Ministry for Infrastructures and Transport, was launched in 1994 with the objective of fostering economic and social rehabilitation of cities and neighborhoods in crisis through the creation and implementation of innovative strategies and an exchange of knowledge and experience in urban fields.

The added value of Urban programs consists in having started a real revolution in urban regeneration policies which no longer focus on single policy areas, but rather are integrated both from a point of view of action taken as well as subjects involved, including private partners.

The novelty lies in knowing the diversity in urban areas and in the need to tackle them with an integrated and strategic vision.

The Urban approach entails:

- the integrated planning of economic, social and urban transformation policies;
- the involvement of the private parties in partnership with offices in the public sector, such as ministries, Regions and municipalities;
- the innovation of internal administrative management, in support of integration between qualified skills and control and evaluation mechanisms to verify whether expected results have been achieved;
- strengthening communication activity as a transversal element which, through spreading information, contributes to creating a situation of knowledge, awareness and trust on the part of citizens;
- the promotion of exchanging good practices, considered a driver for growth and modernization.

The Urban experience has facilitated the development of cities and its participants, which have become important contacts for the European Union and are responsible for territorial policies and the management of financing mechanisms.



SPECIFIC OBJECTIVES AND PRIORITY MEASURES

In order to be able to counter such threats, it is necessary to pursue general objectives of sustainability that in an urban context refers to **social and economic sustainability of development models and settlements, environmental sustainability of anthropogenic settings** in relation to “natural” areas.

These themes should be integrated into the **management of territorial changes and into the planning and designing of cities** whose well-being stems from the application of harmonious development models. Government territorial plans must, therefore, integrate **management plans of existing and future green areas**, taking into account the effect the implementation of the plan will have for the entire territory.

In order to ensure **ecological continuity** also in urban areas, plans have to include provisions for the maintenance of the so-called “ecological corridors”, i.e. natural elements that connect two or more habitats. Ecological corridors are especially effective in conserving Biodiversity by reducing the physical separation between animal or plant populations represented by actual linear barriers (highways, freeways, major railways), widespread barriers (cities, industrial or commercial areas) or the absence or scarce effectiveness of natural areas of connection.

In urban areas, then, the **use of non-anthropogenic land should be limited**, the **maintenance of green areas** should be promoted, **redevelopment of natural area systems** should be focused on ensuring the protection of Biodiversity and urban ecosystems.

Cities affect local climate: the annual average temperature is 0.7-3°C higher, solar radiation has decreased by 20% and wind velocity is lower by 20-30%. It is a well known mechanism. Cement, asphalt, bricks and buildings all capture and store solar energy (heat) during the day and release it at night, thereby preventing adequate cooling.

“The main difference between a natural ecosystem and an urban ecosystem is that the former is able to feed itself and maintain a balance, whereas the latter depends significantly on external resources and is lacking a balance between what enters and what exists, due to the base metabolism of population flows that require food, water, fuel, oxygen, etc. from surrounding agro-ecosystems (and even further away, thanks to today’s global economy) which are then transformed into all types of waste, in CO₂, polluted water and air.”


This must be done by including specific measures in regulations that promote building redevelopment with energy saving solutions which also cover vegetation, for example roof gardens possibly combined with solar panels, vertical gardens (“plant walls”), integration of greenery into building. Lastly, the sustainable use of resources should be ensured, as well as the optimization of the waste cycle.

Ecological services and the economic value of green urban areas

A citizen’s quality of life is greatly affected by the presence of green areas and by the plant elements that offer multiple biophysical and socio-economic benefits and services. The possibility to model and quantify these services in economic terms is one of the most significant aspects of urban ecology. Applying a suitable methodology based on scientific criteria is fundamental in evaluating the costs/benefits of policies for planning and managing urban area policies aimed at creating sustainable development scenarios for cities. Some of the most important services provided by green areas in cities are:

- mitigation of heat islands;
- carbon capture;
- removal of atmospheric pollutants;
- reduction in energy consumption for cooling;
- reduction of rainwater run-off;
- reduction in acoustic pollution;
- increase of property value;
- increase in both physical and mental well-being;
- maintenance of natural habitats.

[Source: Nature Management in Urban Areas, MATTM, Ministry for Environment, Land and Sea]



Villa Borghese (Rome)

The United Nations recognizes that it is necessary to reconcile Biodiversity conservation and the promotion of human health and well-being. Despite this recognition, biodiversity conservation and human health in general are not always addressed within the same context of strategic planning.

Changes in the quality and availability of ecosystem services and the increased variability of local and global weather/climate conditions may synergistically affect food production safety and the determinism of infectious risk factors from using contaminated water and biota.

Moreover, the changes and alterations of Biodiversity also affect the availability of medicinal plants (medicines,



The protective quality of ecosystems for health, such as the purification of water and air, the production of oxygen and many other raw materials, the agricultural productivity in our country, the biological, chemical and nutritional safety of our food, are all tightly linked to our ability to preserve Biodiversity.



aromatic and natural pigments) as well as the spread of infectious diseases, allergies and the toxicological risk due to new species or the change of the toxicity of animal and plant species.

PRINCIPAL THREATS

- **reduced availability of species for aid in medical care**, and, for some communities, the impossibility to practice traditional medicine;
- **reduced availability of plant species for use as dyes** for natural fabrics, food and health products;
- **increased and** altered spread of **infectious diseases**;
- **alteration of ecosystems** facilitating the contamination of biota and the transmission of pathogens to humans and between humans;
- an **increase in the number and the distribution of allergy sufferers** due to the introduction of alien species;
- agricultural practices that affect the **nutritional, biological and chemical safety of food**;
- **an increase in the risk of exposure to toxic substances** from alien species, above all in aquatic ecosystems;
- **synergy with the alterations in the biosphere** caused by climate changes.

The risk associated with potentially toxic algae along Italian coastlines.

The proliferation of microalgae in coastal waters reaching high levels of density is a long-known phenomenon. It is described by referring to the color the water takes (red, pink, green, brown, etc.) due to the dominating pigment of the microalgae. This phenomenon occurs primarily in coastal areas where there is a greater input of nutrients. The proliferation of marine microalgae, which is also influenced by chemical/physical and hydrodynamic characteristics of the water body and by temperature and light, can cause environmental alterations resulting in damage, sometimes serious, to the ecosystem. Furthermore, the hypoxic conditions and the growth of hydrogen sulfide and ammonia, which often accompany the necrosis of cells at the end of flowering, may be responsible for the death of marine fauna (fish, bivalve shellfish and crustaceans). From a health perspective, this phenomenon is important because some of the microalgae produce toxins that can accumulate in shellfish and other fish products regularly consumed by humans. The potential health risks for humans having contaminated fish products in their diet should be carefully evaluated by Health Authorities. As far as recreational use of such marine waters is concerned, there have been reports of respiratory problems attributable to flowering of the microalgae *Ostreopsis ovata*, or possibly due to inhalation of aerosols containing cell and/or toxin particles. Cases of dermatitis, some severe, have been reported in bathers who swam in waters affected by the flowering of marine cyanobacteria.

There is no evidence of systemic pathologies associated with involuntarily ingesting water affected by the presence of toxic marine algae.



Regions where the *Ostreopsis ovata* has been reported

SPECIFIC OBJECTIVES AND PRIORITY MEASURES

On the basis of these brief preliminary considerations, it is not presently a question of whether integrated action with the objective of protecting health is necessary, but rather what action should be taken and, above all, what tools should be developed to **integrate aspects important to health into Biodiversity protection and conservation strategies**.

Great efforts should be made to develop new methods and models to **evaluate the risk associated with the degradation of ecosystems** and to integrate aspects important to public health into plans and programs for the protection and conservation of Biodiversity. Moreover, public awareness should be raised concerning the importance of Biodiversity and ecosystem services for the protection of health by integrating the theme into **environmental education policies**, and the promotion of Biodiversity conservation should be fostered for the protection of health and well-being through local, business, intergovernmental

and intersectoral projects and initiatives. Finally, the protection and sustainable management of plant and animal species is of utmost importance for the preservation of **food production** and of **nutritional safety**, as well as of those species necessary for **therapeutic purposes** and biomedical research.

The priority measures to be taken in this work area are identified in the promotion of planning and implementing:

- *cognitive tools* (databases, indicators) to monitor the impact on medicinal plants on a national scale and on the appearance of major toxicological, infectious and allergenic alien species;
- *operational tools* (guidelines, protocols for monitoring and integrated environmental management) to prevent vector-borne infectious diseases and new allergenic and toxic species;
- *training programs* for operators in the sector;
- *information and awareness raising initiatives* for the public.

Our health is at stake!

The medicinal value of some plants has been known by humankind for thousands of years. Ecosystems offer us enormous health advantages and, as a consequence, also economic advantages. The loss of Biodiversity can bring about huge costs, which we are gradually beginning to realize.

There are significant direct links between Biodiversity and modern medical treatments (Newman and Cragg, 2007):

- about half of all synthetic drugs have natural origins;
- all anti-tumor drugs available, 42% are of natural origin and 34% of semi-natural origin;
- in China, more than 5,000 of the 30,000 higher plant species registered are used for therapeutic purposes;
- three quarters of the world's population relies on traditional natural remedies;
- ginkgo has allowed for the discovery of substances that are very effective against cardiovascular diseases, for an annual turnover of 360 million US dollars.

Despite their enormous health benefits, plant species are disappearing at a sustained rate and they will continue to disappear unless urgent measures are taken. Recently, a global study revealed that **hundreds of medicinal plants, whose natural substances are at the base of more than 50% of prescription drugs, risk extinction**.

The relationship between Biodiversity and health brings up an important question concerning distributive justice. There is often no relation between the regions where the benefits are being produced, those enjoying their value and those bearing the opportunity costs of preserving them. Using this line of reasoning, the species that are the source of many new drugs are most likely to be found in the poorest tropical regions, whereas those benefitting are almost always people who live in rich countries where such drugs are more readily available and are more affordable. Those living in these countries will, then, have a great incentive to preserve the natural habitats in the areas of the world richest in Biodiversity. Such conservation entails, however, costs for the locals in these areas, in particular the opportunity costs such as the loss of potential profits from agriculture due to the failure to convert such habitats. Retraining some of the benefits enjoyed by rich countries to locals might be an approach to consider in order to favor conservation of said habitats and natural species, which create advantages that are clearly broader on a global level.

(Adapted from TEEB The Economy of Ecosystems and Biodiversity)



Ginkgo Biloba

The impact of the energy sector on Biodiversity differs considerably on the basis of both the various phases of the energy cycle – production, transport/distribution, transformation and final consumption – and the source of energy being used. With regard to traditional energy sources, both direct and indirect impact can be felt, especially in the phase of energy transformation of fossil fuels that are responsible for the release of substances into the atmosphere capable of contributing to climate change or acidification, eutrophication and the formation of tropospheric ozone. Moreover, combustion systems release heavy metals into the atmosphere, such as mercury, lead and cadmium, which can build up in organisms in the course of time, with potentially toxic effects.

The use of fossil fuels is also linked to the marine pollution risk posed by hydrocarbons. The Mediterranean is particularly at risk, since although it makes up only 1% of



Renewable energy is energy that comes from resources that regenerate or that are not “exhaustible” on a human time scale, and, by extension, whose use does not compromise natural resources for future generations. Therefore, “renewable energy resources” are generally considered the sun, wind, seas, the earth’s heat, whereas “non renewable” resources are those that are currently being consumed faster than nature can create them (in particular fossil fuels such as petroleum, carbon, and natural gas), and which are present in non inexhaustible reserves on a human time scale (such as the isotope uranium-235, the element currently most used to produce nuclear energy).

(adapted from Wikipedia)



the global marine surface, it is crossed by 28% of the world’s oil tankers.

In addition to the processes connected to the use of fossil fuels, Biodiversity can also be negatively affected by the production of biofuels and by electricity generation from renewable sources such as hydroelectric, wind, solar and geothermal and the use of nuclear energy.

PRINCIPAL THREATS

- impact of Biodiversity in sensitive areas connected to **extraction of fossil fuels**;
- **consumption of nature areas** to host new plants and associated structures, with the consequent negative pressure on habitats and species;
- atmospheric, acoustic, light, water, soil, magnetic **pollution**;
- effects produced by **climate change**;
- effects produced by **acidification, eutrophication and tropospheric ozone**;
- the risk of **oil spills** and accidents involving maritime transport of oil products;
- the **reduction of water capacity of waterways** subject to hydroelectric exploitation;
- the **impact of wind farms** on birds;
- the risk for native species of the **spread of rapidly growing alien plant species** for the production of biomasses for energy use;
- the **fragmentation of ecosystems** and the disruption of natural ecological corridors resulting from the construction of transmission lines;
- pressure on habitat species **linked to energy production projects**.



The Strategic Environmental Assessment (SEA)

(Directive 2001/42/EC)

is a process aimed at integrating environmental considerations into the plans and programs of different sectorial policies; it is defined as “the systematic process intended to assess environmental consequences of actions proposed – political, plans or initiatives within the scope of the programs – in order to guarantee that such consequences are fully included and dealt with adequately from the initial phases of the decision-making process, on the same level as economic and social considerations.”



SPECIFIC OBJECTIVES AND PRIORITY MEASURES

In order to tackle threats from the energy sector, there must be **integration of specific objectives of the Strategy into the National Energy Plan** through reinforcement of governance among the institutions involved and the integration of energy policies into territorial planning.

The promotion of energy efficiency is of fundamental importance in reducing the consumption of primary sources.

With regard to threats from the use of alternative energy, it is incumbent to promote the sustainability of energy crops, stressing the need to focus on short supply chains that have an energy balance (and carbon) actually advantageous, that are not the cause of Biodiversity and soil loss. Lastly, as far as the construction of new infrastructures is concerned, the following should take place: solutions mitigating the impact due to their construction and operation; the mitigation of acoustic, light, atmospheric, soil and magnetic pollution must be fostered by finding forms of mitigation that provide for green areas and the maintenance/creation of ecological corridors and natural habitats; the use of non-anthropogenic

soil must be limited, favoring expansion, when possible, of existing infrastructures, safeguarding natural areas and habitats. Furthermore, it is of the utmost importance to apply the **Strategic Environmental Assessment** for the integration of environmental themes into the drawing up of sustainable energy plans and programs, and apply the procedures of the landscape report in order to identify the best solutions for integrating the infrastructures into a nature and landscape context.

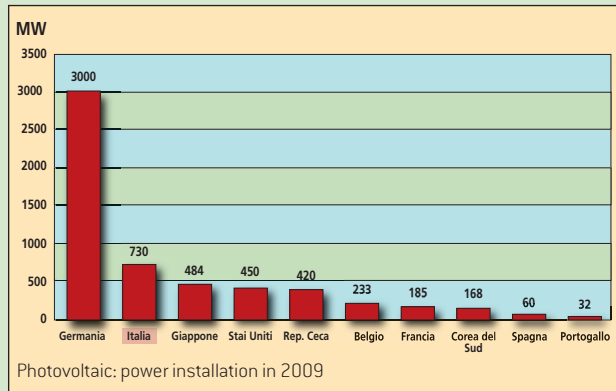
Renewable energy in Italy and in the world

Renewal Energy Sources - RES (solar thermal power, photovoltaic, wind, etc.) are experiencing tremendous growth on a world-wide scale and are increasingly taking on an important role in energy production. In addition to being inexhaustible, these energy sources have a null environmental impact because they do not produce either greenhouse gases or polluting waste that must be disposed of. In recent years, the world share percentage of energy produced through these sources has risen significantly (as can be seen from the graph below, which describes the growth of wind energy in Italy in recent years); if this trend continues, renewable energy sources will experience unparalleled growth in the next decade, in particular wind and solar energy.

Also interesting are the figures of photovoltaic solar energy, for example in 2009, in Italy, there was an installation of 730 MWp, in France of 185 MWp, and in Germany of 3,000; these can be considered exceptional increases if one considers that in 2008 in the entire world, installed photovoltaic solar energy reached 5,600 MWp.

It was estimated that the RES will be the only energy sectors experiencing strong growth in terms of turnover, number of people employed and amount of energy produced. Therefore, this type of energy production is emerging as the real innovation for the near future on the world energy scene.

In Italy, focusing on renewable energy sources, in particular solar, wind and geothermal, can be an extraordinary occasion to create new jobs and reduce dependence on imported oil, as well as facilitate technological research and innovation. It is also an opportunity to redesign and improve the quality of our cities, renovate and restore buildings that consume too much energy and capture too much heat in the summer and cold in the winter. The path to follow is to enhance the natural resources – sun, wind, water, biomasses and subsoil heat – according to their local potential.



[From <http://www.fonti-rinnovabili.it>]

All over the world, tourism is one of the most important and fastest growing sectors of the economy and can contribute significantly to employment growth through ethical progress which takes into account the opportunities that each individual has to rediscover the value of socialization, the effective protection of the environment and the balanced exploitation of natural resources. For this to occur, tourism activities must be re-aligned in such a way as to satisfy sustainability requirements, becoming at the same time the testing ground and the engine of growth that is respectful of natural ecosystems to the benefit future generations.



Because it is based mainly on environmental, cultural and social quality, tourism might risk becoming economically and socially unsustainable when it causes the deterioration and depletion of the resources that are the source of its profitability. On the contrary, the sustainable development of tourism is linked to the growth of quality rather than quantity and, consequently, to the activation of types of uses that do not affect the status of nature conservation but, rather, enhance it.



UNSUSTAINABLE TOURISM ACTIVITIES CAUSE

- **soil consumption, alteration or destruction of ecosystems and habitats**, including the extraction of construction materials used to build tourist infrastructures;
- **increase risk of erosion** and fires;
- **removal and consumption of flora and fauna** and disturbance to wild species, thereby effecting behavior, mortality and successful reproduction;
- **an increase in the consumption of primary goods** and materials (water, energy);
- **deterioration of water quality** (drinking water, coastal waters) and the eutrophication of aquatic habitats;
- **an increase in the production of solid waste**;
- **air pollution** and the production of greenhouse gases due to increased mobility demands;
- **acoustic pollution**.

Biological Diversity and Tourism: Development of guidelines for sustainable tourism in vulnerable ecosystems

Sustainable tourism can generate jobs and economic returns, becoming an incentive for preserving nature areas. It can also increase public awareness of many products and services that natural systems and biological resources offer us, and boost respect for traditional knowledge and practices. Sustainable tourism, then, has the potential to combine economic and environmental demands and to give tangible meaning to sustainable development. The CBD guidelines for sustainable tourism in vulnerable ecosystems and habitats that are of great importance for biological diversity (Santo Domingo, 2001) are centered on the possibility of mutual support between tourism and Biodiversity through involvement of the private sector and local and indigenous communities, and the promotion of territorial infrastructure planning based on principles of conservation and sustainable use of Biodiversity.

Although drafted for particularly vulnerable areas, they can obviously also be used in any geographical area and for all tourist destinations.

SPECIFIC OBJECTIVES AND PRIORITY MEASURES

Global trends and priorities change; today more than ever tourism must remain competitive, taking into account and recognizing, however, that in the long-term **competitiveness depends on sustainability**. The challenges for sustainable tourism are linked to **changes in standard models of consumption**, centered particularly on seasonal concentration, aiming at exploitation models that are more respectful of the territory. Proposals should be made by way of **appropriate marketing and awareness raising strategies** targeting communities on the subject of **sustainable tourism** and the critical consumption of resources, in order to change the traditional concept of tourism in such a way as to ensure respect for the limits of natural resources and their ability to regenerate, and ensure a just and equal sharing of the resulting benefits, particularly as regards local populations.

With an eye on sustainable tourism, the national image in world markets should be promoted, highlighting Biodiversity, the resources and features of different areas, favoring both integration with other economic activities and integration between conservation and sustainable use of Biodiversity and development of tourism. It will also be essential to reinforce incentive mechanisms for the development of sustainable tourism.

Naturally, care must be taken to act in such a way as to **prevent and minimize the impact** on those parts of

Biodiversity and landscape affected by tourist activities, and clean-up and restoration efforts must be made. If necessary, a set of indicators should be identified so that evaluations can be made and responsible decisions taken at all levels concerning the subject of tourism and Biodiversity. It would be useful to **foster the use of existing regulatory instruments**, revising them if necessary, or developing new, more effective instruments in order to incentivize forms of quality tourism and encourage respect for the integrity of local cultures by enhancing the role of local communities in offering tourism.

For example, the strategic use of rural areas and marginal and typical tourist economies can be supported in the context of integrated rural development and territorial vocation, but also by enhancing the system of protected areas and encouraging their role as a model for good practice for the sustainable management of tourism in favor of Biodiversity. It would also be desirable to **promote a gradual national mobility network** which would have as its fundamental requirement the recovery of decommissioned territorial infrastructures (railways, roads, embankments, historical pathways, sheep-tracks, etc.) the compatibility and integration between various users, the separation or protection of ordinary road networks, integration with the local public transport system and with widespread hospitality networks.

The EDEN project: European competition for the development of sustainable tourism


The EDEN Project (European Destinations of Excellence) is an initiative whose purpose is to draw attention to the richness and variety of European tourist destinations and to promote those destinations where objectives of economic growth are in harmony with the social, cultural and environmental sustainability of tourism. The Project rewards lesser known destinations that are off the beaten track and which pursue economic growth and sustainable tourist development. The competition takes place on a national scale with the involvement of central administrations of Member States and candidate countries (Ministries, government bodies, etc.) whose duty it is to identify in their own territories five finalists from which a winner will be chosen. The European Commission launched the fifth edition of the EDEN Project in 2011 with the theme of "Tourism and Regeneration of Physical Sites". The Department for Development and Competitiveness of Tourism of the Council of Ministers presented its own proposal to the European Commission which provides for collaboration with the Ministry for the Environment – Land and Sea Protection, the Ministry for Economic Development, the Regional Coordination for Tourism, ENIT – National Tourist Agency, ANCI – National Association of Italian Municipalities, and UNCEM – National Union of Mountain Municipalities, Communities and Bodies.



The new Rimini Paper for Sustainable and Competitive Tourism

The 2008 Rimini Paper for Sustainable and Competitive Tourism validates the 2004 Aalborg Commitments with reference to Sustainable Tourism, and endorses the direction of the World Tourism Organization with reference to sustainable tourism, and in particular to:

- making the best use of environmental resources that represent key elements for the development of tourism, protecting the maintenance of vital ecological processes and contributing to preserving natural heritage and Biodiversity;
- respecting the social/cultural authenticity of host communities, and encouraging the conservation of their cultural heritage, both material and immaterial, as well as their traditional values, and contributing to understanding and respecting different cultures;
- ensuring long-term socio-economic benefits that are fairly distributed to all interested parties, among which employment stability;
- guaranteeing informed participation by all interested parties;
- constantly monitoring impact;
- keeping the level of tourist satisfaction high by increasing their knowledge of sustainability themes.



Research and technological innovation applied to the environment are valid tools to combine economic development and environmental compatibility: both allow embarking on new paths that ensure the safeguarding of non renewable environmental resources and the spread of productive models with greater ecological compatibility.

The need for scientific research, which is the premise and base both for the advancement of knowledge aimed at understanding the complex mechanisms that regulate ecosystems and their protection, as well as for the planning and development of innovative methodologies for the analysis, monitoring and enhancement of Biodiversity, has been fully accepted and has entered into municipalities' expectations.



SPECIFIC OBJECTIVES FOR THIS WORK AREA HAVE BEEN CHANGED BY THE CARTA DI SIRACUSA ON BIODIVERSITY

1. Continuing the process of exploring mechanisms to improve the science-policy interface for biodiversity and ecosystem services for conservation and sustainable use of biodiversity, long term human well-being and sustainable development.
2. Supporting cooperation among countries, relevant international organizations, research institutes and NGOs to further global monitoring of biodiversity, building upon the effective networking of existing monitoring schemes.
3. Collecting data on biodiversity, including those relating to suitable human welfare indicators: indicators that are reliable, comparable and interoperable, and developing global systems for exchanging scientific knowledge, the best practices, technologies and innovations, referring to the organizations, to processes and to already existing mechanisms.
4. Fostering comprehensive and focused research and capacity building, at all levels, on biodiversity and ecosystem services, taking into account different capabilities of countries and improving the development and wide use of advanced technologies to carry out monitoring of biodiversity changes and global environmental assessment.

The National Research Program (PNR – Programma Nazionale della Ricerca) 2010-2012

The PNR is a source of guidance for the coordinated development of research activities.

The National Research Program adopts an innovative-based approach, where public and private research is continuous, and between knowledge driven research and applied research. It was already suggested in the previous National Research Program to integrate public and private research: public/private laboratories, the strengthening of high technology districts, supporting large strategic research programs. With the evolution of national legislation for financing "Research of Important National Interest", the Italian Ministry for Education, University and Research (MIUR) started a new mechanism for the allocation of funds, based on precise qualifying points: co-financing, group research work, and the principle of the evaluation of research projects. It is the Program of Research of Important National Interest (PRIN) which provides for free and autonomous research proposals, without having to refer to basic themes that were predefined at a central level. The PRIN favors proposals which integrate various expertise and contributions from different universities. Applied research focuses on proposals that highlight particular consideration towards potential users of the results.

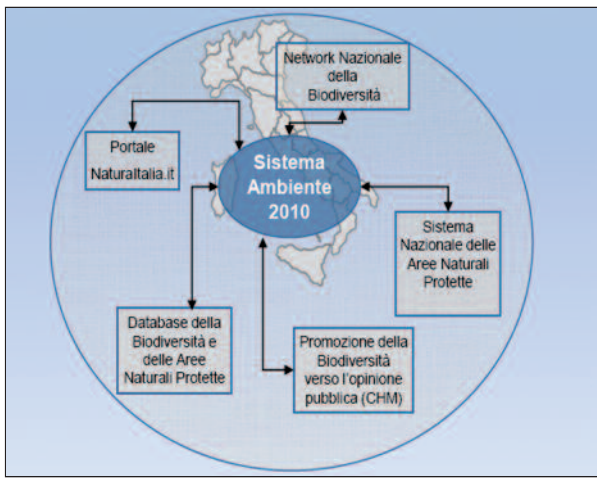


SPECIFIC OBJECTIVES AND PRIORITY MEASURES

Concerning knowledge of Italian Biodiversity, one of the main obstacles encountered was combining the numerous sources of data, which for various reasons (academic, business, public, private, local, central) exist in the territory. For this purpose, one of the main priority measures will be the development of a **“National Biodiversity Network”**, within the Project “Environment System 2010”, as an Italian network of research centers and infrastructures capable of gathering, sharing, improving and spreading knowledge of the different components of Biodiversity and of the processes that affect their conservation.

It will also be necessary to **intensify both research on** the status, trend and distribution of habitats and species that are of a conservation interest and prepare adequate and constant **monitoring** of the most significant threats to Biodiversity by developing and testing out prevention and mitigation action. Moreover, the periodic review of research programs in matters concerning the environment should be encouraged, taking into account the demands and priorities that are currently evolving.

In order to **combat genetic erosion**, it will be important to define and validate the methods used to learn about and evaluate the different local varieties of genetic heritage and the zootechnical animal breeds/populations that have not spread out much, by using genetic markers and by studying new models of conservation of plant and animal populations in order to ensure their survival and guarantee the maintenance of sufficient genetic variability. Moreover, it will be necessary to incentivize the study of capabilities of adaptation and resistance to new emerging pathologies



(plant or animal) of local plant varieties and zootechnical animal breeds/populations at risk for genetic erosion, support and coordinate action aimed at the continuous and organic **genetic and functional characterization of the heritage of available genetic resources and work for coordination in finding genetic resources**, conserving them and in managing existing collections.

Also of fundamental importance is the development and application of methodologies to improve the efficiency of major policy instruments for the conservation and sustainable use of Biodiversity, assign adequate **financial resources to research** on Biodiversity and circulation of the results, and encourage the preparation of an inventory of traditional knowledge and technologies so that they can be maintained.

The National Maritime Technological Platform (PTNM – Piattaforma Tecnologica Nazionale Marittima)

Competitiveness and sustainability are the main objectives for growth in the era of globalization, just as investment in knowledge and education is the key to success. It is for this reason that, in line with the experience of European Technology Platforms, Italy has created the National Maritime Technology Platform (PTNM), which involves all the players in the sea sectors (economic, scientific or institutional) with the purpose of creating a consolidated network among them and a common vision in terms of technological growth and development of initiatives of national importance. The National Maritime Technology Platform was created in 2005 based on the strong willingness of the economic system to have a single place where industry, the research system and administrations of research, education and innovation could come together. Today, the National Maritime Technology Platform is reflected in the European Commission’s strategy to enact an integrated maritime policy (the Blue Paper) and to encourage member countries to adopt holistic action strategies for the sea. The National Maritime Technology Platform is recognized by the European Commission as the strong point of the country system and as a mirror group of the European Platform WATERBORNETP, due to its compliance with the integrated approach to the sea sectors.



14 Education, Information, Communication and Participation

Education, information and communication in the environmental field presently play a particularly important role, together with the increased seriousness of environmental issues and consciousness

of the complexity of the solutions, it has become necessary to inform citizens on the subject in order to sensitize them and, at the same time contribute to increased awareness, but above all to individual and collective responsibility.

PRINCIPAL THREATS

- the **difficulty** of environmental education and information to **educate the public on what Biodiversity is** and increase awareness of its intrinsic value, its functions and its economic value;
- the **inadequacy of environmental education** to adapt to the complexity of the human/environment relationship (environmental education oriented towards sustainability must spur understanding of the complex relationships that interconnect anthropogenic, individual and collective action with ecosystems at a local and global level);
- **lack of strong capability to bring about changes in firmly rooted attitudes and behaviors;**
- **difficulty in developing critical thinking**, and a lack of active and responsible citizenship concerning Biodiversity;
- **lack of synergy** and coordination **between individuals/systems operating in the sector;**
- **lack of efficient communication and dissemination** of the subject, particularly concerning resolution of the conflict between the need to conserve Biodiversity and ecosystem services, and the economic development of local communities;
- **lack of content relating to** knowledge, conservation and sustainable use of Biodiversity in academic curriculums;
- the lack of structured **educational projects** (in both formal and informal settings) with a multidisciplinary/transversal approach (not only scientific, but also cultural, emotional and aesthetic);
- the lack of a **proven system of quality indicators** in order to evaluate the effectiveness of educational projects.

The right to environmental information

The right to access information on environmental matters was first ratified in Italy with the establishment of the Ministry for the Environment to which Law no. 349/86 assigned the institutional role of coordinating and promoting activities concerning environmental education, information and training, while also assigning an important role of collaborating with the Ministry for Education.

Legislative Decree no. 39/97 granted the right of access to anyone intending to exercise such right, without any selection process, and independent of any particular qualification or condition of legitimacy.

The subsequent European Directive no. 2003/4 was applied nationally by Legislative Decree no. 195 dated 19 August 2005 which started a sort of revolution in relation to the role of the Public Administration that was no longer seen as a passive supplier of information, but became the disseminator of such information; along with regulations concerning access to environmental information upon request, provisions were added regarding the distribution and dissemination of environmental information.

In protecting the right to access environmental information, information and communication technologies are a fundamental mechanism for guaranteeing that environmental information is systematically and progressively made available to the public and disseminated. State, regional and local public administrations and every physical or legal person who carries out public duties regarding environmental themes are called to not only manage the requests of interested people, but to make environmental information held in electronic databanks easily accessible to the public through public communication networks, which should be available on the web and updated annually.



SPECIFIC OBJECTIVES AND PRIORITY MEASURES

The objective of familiarizing the public with Biodiversity and the complex system of environmental, economic, social and cultural relationships which can determine its loss or conservation, thus making everyone able to make decisions and conduct themselves in a culturally appropriate way and locally significant for its conservation, would entail developing a multiplicity of values, behaviors and expertise.

The value and culture of Biodiversity are themes that must transversally permeate all of society, therefore, it is **necessary to render all information on the value of Biodiversity clear, accessible and comprehensible** to facilitate greater sensitization and incentivize the adoption of responsible behavior.

Since the theme of participation, access to information and environmental communication is ever more present within the international, community-wide and national regulatory framework on sustainable development, it has become evident that in order to tackle environmental problems efficiently and to pursue sustainable social and economic development able to preserve the environment we live in and to guarantee it for future generations, governments and administrations must inform and involve the community as

a whole in decisions that affect the territory and the quality of life.


Therefore, specific education on the importance of Biodiversity must be improved not only for educators, but also for policymakers and administrators; also, **Biodiversity education must be present in academic programs**, as an aspect of sustainability both within disciplines that already exist and in interdisciplinary and project areas. There is a strong interdependence between the demands of environmental protection and the right to information: for no other good or value such as the environment is the dissemination and adequate circulation of information and knowledge, including technical, indispensable for a proper definition of the objects and methods of protection.

It should be taken into account that Italy has a tradition in the field of environmental education which includes a plethora of people and structures, both public and private, that represent a starting point that can be built upon, ensuring at the same time national coordination. Therefore, **negotiation, sharing and exchange of good practices** among subjects operating in the field of education for environmental sustainability and conservation of Biodiversity should be fostered.

From the UNESCO Declaration “For a Culture of Biodiversity”

[...] • **BD interacts with modern and traditional knowledge and with people’s identity, contributing to protect and enhance cultural diversity.** BD education, in its different meanings, is an integral part of education for sustainable development, aimed at building an aware **citizenship** which enables, also through the adoption of more conscious -individual and collective- behaviors, the promotion of strategies and tools to meet the needs of a better quality of life, without compromising ecosystem stability.

- Several international commitments have been taken (CBD, MDG, The Johannesburg Plan, The Syracuse Charter), but now it’s time to move forward, to promote an engagement in concrete actions; starting from governments and local institutions, everyone has to make a contribution to ensure **Education for BD as a life-long cultural and learning process**, concerning both young people and adults, individuals and communities, which provides competencies and knowledge, but also values and sensitivity capable of orienting decisions in many sectors, professional, political, commercial, research, as well as citizens’ everyday choices: consumption, tourism, food, etc. involving all the aspects of society.
- **An effective educational strategy for BD should incorporate the following objectives:** rethinking our relationship with nature; reinforcing the role of education and environmental information; increasing specific training for educators; encouraging the sharing and exchange of good practices among people who operate in the field of education for sustainability; improving the adoption of responsible behavior; facilitating the activation of participatory processes and major involvement of local communities in order to build an enduring future, based on awareness and participation.
- **Didactical programs, both in schools and universities, must be multidisciplinary.** Since biodiversity loss derives from unconscious behaviors and speculative economic activities, programs should not be only theoretical, but should include the involvement of students in practical actions, visits, excursions, etc. **Parks and protected areas represent the best laboratories** from which we can learn how to understand the natural systems we depend on, their benefits, and how we ought to behave in order to protect them. Moreover it is important to build a territorial network which links administrations, enterprises, associations, cultural operators, media, etc. in order to carry out an “alphabetization process” on the culture of BD protection and its sustainable use.



15 Italy and global Biodiversity

Biodiversity is a common good whose integrity is indispensable for the reduction of poverty and for guaranteeing firm and defined development projects for the poorest countries. Three quarters of the billion people who survive on less than a dollar a day live mainly in rural areas and base their livelihood on natural resources and ecosystem services, and are, consequently, the hardest hit by environmental degradation and the loss of Biodiversity. Each country's international responsibility and commitment of each country can "strategically" affect

the protection of Biodiversity in developing countries through improving international governance so that it takes into account, from a global responsibility perspective, the impact that national policies and actions have on the Biodiversity of third countries.

In order to achieve such an improvement, it is essential to promote consistency among Italian policies in matters of cooperation in development, international commerce and the utilization of natural resources from third countries, as well as promote what is discussed in the work areas of this Strategy.

OUR COUNTRY'S COMMITMENT TO REACH THE OBJECTIVE OF ERADICATING POVERTY CAN BE SEEN IN INTERNATIONAL COOPERATION PROJECTS, ABOVE ALL WITH COUNTRIES THAT DO NOT BELONG TO THE EUROPEAN UNION, WITH WHOM WE INTEND TO CONTRIBUTE TO PRESERVE BIODIVERSITY THROUGH

- the preservation and sustainable use of ecosystems and habitats that are characterized by wide diversity, with a vast number of endemic, threatened or migratory species that represent basic evolution processes or other biological processes having social, economic, cultural and scientific importance;
- support from the management of the protected areas, aimed at improving management abilities, the promotion of participatory managerial approaches, developing compatible economic activities in the same areas or in neighboring areas;
- the preservation of species and communities under threat or having medicinal, agricultural, forest, etc., value;
- the preservation of genome and gene types of social, scientific or economic importance;
- equal distribution of benefits stemming from the use of genetic resources;
- safeguarding transnational species, also through the promotion of protected areas or sanctuaries in international waters shared among different countries, and the use of ecological protection areas in addition to "country's territorial waters" [Law no. 61/2006].

The Program FLEGT

The FLEGT program (Forest Law Enforcement, Governance and Trade) is a joint initiative among EU countries that intends to coordinate measures and promote agreements and responsible behavior concerning management of the world's forests. EC Regulation no. 2173/2005 establishes the obligation of a license that guarantees to European consumers the origins of products, thus combating poor local governance of trade in timber and the high rate of corruption that surrounds it, providing better controls on imports and on the traceability of tropical timber. The FLEGT license is a verifiable document that cannot be falsified, which certifies that a batch of timber complies with governing regulatory requirements of the country of origin. The first licenses issued only for timber export in the EU is expected for 2011 from the Congo, which exports **250 million euros of timber** each year. The agreement with Cameroon, on the other hand, will have to wait until 2012.



The EU wants to provide better controls on the import and traceability of tropical timber products

In order for the agreements to be successful, a series of provisions will have to be put into practice so as to foster **the efficacy of the mechanisms** provided for in the agreements. A national system of traceability of timber is being prepared, which is supported by a Community contribution of two million euros and by national co-financing of 1.08 million euros.

SPECIFIC OBJECTIVES AND PRIORITY MEASURES

Specific objectives inherent to this work area are:

- to **reinforce the efficacy of international governance** for Biodiversity and ecosystem services so that effective implementation of the CBD can be pursued on a global level, as well as the integration of Biodiversity in global processes;
- to **increase**, in real terms, the **financial resources** allocated to projects that directly foster Biodiversity, through an increase in the general contribution for Biodiversity on the part of European Union Member States;
- to **drastically reduce the impact that international actions and exchanges have on Biodiversity** and the ecosystems on a global scale, starting from identifying and evaluating the main effects of such activities on the Biodiversity of third countries.

To achieve these objectives, it is vital to create an awareness in public and private businesses that operate in third countries so that when planning and carrying out their activities they take into account Biodiversity conservation, ecological integrity and, consequently, smaller Community economies that depend on functional ecosystems.

These activities primarily take place in developing countries and are generally linked to energy production sectors (dams,

diversion of waterways, agro-fuels), sale of raw materials and agricultural production and livestock, with a series of consequences in terms of hydrologic cycle alteration, deforestation, soil contamination, land drying, generating potential conflicts due to diverse interests for the use of a scarce resource, for example water.

It would appear, therefore, necessary to adopt within the international cooperation, a code of conduct that guarantees ecological integrity in projects, and in the measures to be taken. All of the initiatives that are provided for will then be guided into the logic of offering new knowledge and new mechanisms of sustainable development to integrate with (not substitute) culture, tradition, customs and activities of indigenous peoples.

Moreover, it would be desirable to reinforce the international image of Italy in terms of Biodiversity conservation to ensure synergy and greater consistency among the actions being taken on the issue of governance, international exchange, and cooperation for development. This undertaking, which must also be translated into a strengthening of finances designated especially for Biodiversity, would represent a contribution to the most effective implementation of the CBD and the relative agreements.

Italian Development Cooperation and Biodiversity Conservation

Italian Cooperation is actively involved in the international process aimed at identifying and adopting strategies for the management of ecosystems that are included within the borders of several States. In particular, in matters concerning the protection of Biodiversity, Italian cooperation is sponsoring a series of projects that contribute to:

1. the conservation and sustainable use of ecosystems and habitats with wide-ranging diversity and a vast number of endemic or threatened species; populated by migratory species; representative of basic evolution processes or other biological processes; having social, economic, cultural or scientific importance;
2. the conservation of species and threatened communities having medicinal, agricultural or other values;
3. the conservation of genome or gene types of social, scientific or economic importance;
4. the equal distribution of benefits deriving from the use of genetic resources.

Albania Project: protection of the Posidonia Oceanica ecosystem whose general objective is to improve the knowledge and the protection of the Posidonia Oceanica prairies along Albanian coasts to contribute to the management of marine resources and the coastal area in Albania.

BENIN/BURKINA FASO/NIGER/TOGO Project: for the promotion of the local development and participatory governance of natural resources and the economy of Biodiversity in the departments of Say, Kollo and Boboye.

Global Strategy for the Islands: has the objective of promoting and supporting sustainable development initiatives on the Islands and in Developing Small Insular States through technical and financial assistance to local institutions.



The COP 10 of the CBD between expectations and results



In October 2010, the tenth Conference of the Parties of the CBD took place in Nagoya, Japan, and the protocol on access and just and fair distribution of benefits deriving from genetic resources was adopted, which was defined as historically successful by Ahmed Djoghlaif, Executive Secretary of the CBD. The Strategic Plan for the period 2011-2020 was also reviewed with an eye on Biodiversity to be achieved by 2050, and a new mission for 2020, with five general objectives and twenty operative objectives to be reached by that date.

The Strategy for the Mobilization of Resources

In order to be able to concretely implement the new 2011-2020 Strategic Plan, the COP10 of Nagoya confirmed the need to implement the Resource Mobilization Strategy (RMS) already adopted in 2008.

The Parties recognized the urgency, reaffirmed also in objective 20 of the Strategic Plan, that “no later than 2020” “the mobilization of financial resources from all available sources should be substantially increased with respect to current levels”. Such increase should take place also through supplementary innovative financial mechanisms, exploring all possible alternative forms for finding resources, from monetizing the economic value of ecosystems to mobilizing private resources.

To do this, each country will have to define a specific strategy on the subject, having regard to the appropriate involvement on the part of key stakeholders and taking into account a stringent scheduling of activities to be finished by 2012 with the adoption of the economic targets of the RMS.

The importance of the Resource Mobilization Strategy was reconfirmed, also within Europe, by the new Strategy for Biodiversity (COM(2011) 244 final) which affirms the need to consider the economic value of Biodiversity in the decision-making process, referring to the results of the TEEB study, and emphasizing that the estimate of the economic value of nature is an inevitable step in reaching the strategic objectives.

The Commission, together with Member States, has undertaken to promote the development and use of innovative financial mechanisms and has urged that financial flows (their own resources and innovative resources) be reported in Action Plans and in national Strategies, in support of Biodiversity and ecosystem services.

“The CBD’s vision for Biodiversity “For a world that lives in harmony with nature where by 2050, Biodiversity will be appreciated, preserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and providing all essential benefits.””

The mission of the Strategic Plan is to “undertake urgent and effective action to halt the loss of Biodiversity in such a way as to ensure that by 2020 ecosystems have the ability to recover and continue to supply essential services to ensure the variety of life on the planet, contribute to the well-being of humans and to the eradication of poverty. For this to occur, pressures on Biodiversity must

be reduced, ecosystem services must be restored, biological resources must be used in a sustainable fashion and benefits stemming from the use of genetic resources must be divided up justly and equally. Moreover, adequate financial resources must be procured, competencies must be consolidated, the issues and values connected to Biodiversity must be taken into account, appropriate policies and base decision making on solid science and on principles of precaution must be implemented.”

THE 5 STRATEGIC GOALS AND THE 20 OPERATIONAL TARGETS OF THE CBD

Strategic goal A. Tackle main causes that are at the root of biodiversity loss including production and consumption models, to ensure that anything regarding biodiversity be taken into consideration by government and society at large through communication, education, creation of new awareness and appropriate incentive measures on an institutional level;

Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Strategic goal B. Reduce the pressures on biodiversity and encourage its sustainable use; to do this, the commitment of the agricultural, forest, fishing, tourism, energy and other sectors will be vital.

Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation are significantly reduced.

Target 6: By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Target 7: By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Strategic goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity. While long-term actions to reduce the causes of biodiversity loss are producing results, immediate action can help conserve biodiversity, also in the case of ecosystems that are in critical condition, by using protected areas, restoration of habitat, programs to recover species and other action aimed at conservation;

Target 11: By 2020, at least 17 percent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Strategic goal D: increase benefits deriving from biodiversity and ecosystem services. The upkeep and recovery of ecosystems in general provides effective ways to counter climate change. Therefore, even though climate change represents another serious threat to biodiversity, countering this threat offers big opportunities for the conservation of biodiversity and its sustainable use;

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 percent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation as well as combating desertification.

Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

Strategic goal E. Improve implementation through participatory planning, management of knowledge and the development capabilities. National planning processes must become more efficient when integrating biodiversity and in emphasizing its importance in social and economic agendas. Convention bodies must become more efficient in analyzing its implementation and in obtaining support and guidance for the Parties.

Target 17: By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

Target 18: By 2020, traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and are fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

The new basis for European policy on Biodiversity

In its communication “Our life insurance, our natural capital: an EU Biodiversity Strategy to 2020” the European Commission launched the new Strategy through 2020 to protect and improve the status of Biodiversity in Europe in the next decade. The strategy sets out six objectives which center on the main factors responsible for the loss of Biodiversity and which will reduce, to a certain extent, the pressure they exert on nature and on ecosystems in the EU, committing main policy sectors to objectives dealing with Biodiversity. Aspects of worldwide Biodiversity are being dealt with so that the EU can contribute in countering Biodiversity loss that takes place in various parts of the planet. The Strategy is in line with commitments made by the EU last year in Nagoya, Japan.

2050 Vision

By 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity’s intrinsic value and for their essential contribution to human well-being and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided.

2020 Headline target

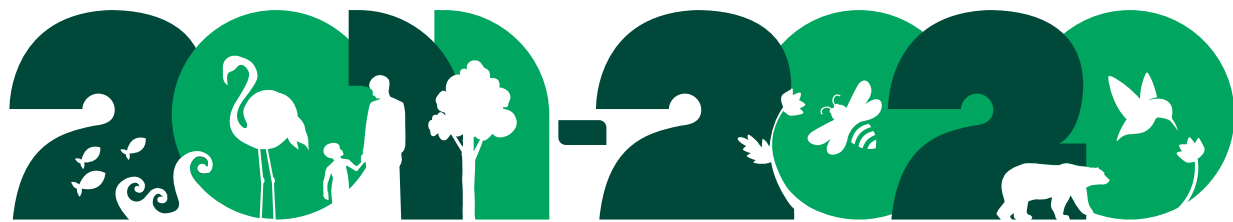
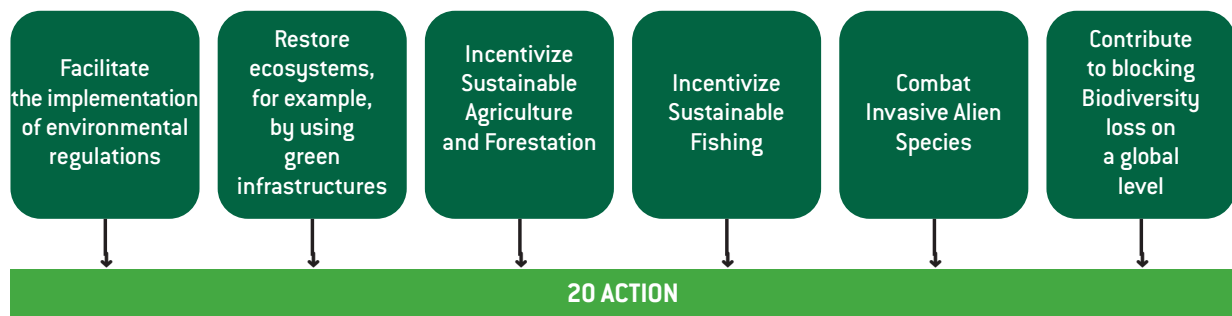
Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.

VISION FOR 2050

KEY OBJECTIVE FOR 2020:

Halt the loss of Biodiversity – restore Ecosystem Services – contribute to worldwide Biodiversity

6 PRIORITY OBJECTIVES



United Nations Decade on Biodiversity

Target 1 – Preserve and restore the natural environment by fully implementing the Habitats and Birds Directives:

To halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant and measurable improvement in their status so that, by 2020, compared to current assessments: (1) 100 % more habitat assessments and 50 % more species assessments under the Habitats Directive show an improved conservation status; and (2) 50 % more species assessments under the Birds Directive show a secure or improved status

Action 1: Complete the establishment of the Natura 2000 network and ensure good management.

Action 2: Ensure adequate financing of Natura 2000 sites.

Action 3: Increase stakeholder awareness and involvement and improve enforcement.

Action 4: Improve and streamline monitoring and reporting.

Target 2 – Preserve and enhance ecosystems and their services:

By 2020, preserve and enhance ecosystems and the relative services through green infrastructures and the restoration of at least 15 % of degraded ecosystems

Action 5: Improve knowledge of ecosystems and their services in the EU

Action 6: Set priorities aimed at restoring ecosystems and promoting the use of green infrastructures

Action 7: Ensure that there is no net loss of biodiversity and ecosystem services

Target 3 – Ensure the sustainability of agriculture, forests and fishing:

3a) Agriculture: *By 2020, maximize areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services as compared to the EU2010 Baseline, thus contributing to enhance sustainable management.*

3b) Forests: *By 2020, Forest Management Plans or equivalent instruments, in line with Sustainable Forest Management (SFM), are in place for all forests that are publicly owned and for forest holdings above a certain size (to be defined by the Member States or regions and communicated in their Rural Development Programmes) that receive funding under the EU Rural Development Policy so as to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by forestry and in the provision of related ecosystem services as compared to the EU 2010 Baseline*

Action 8: increase payment to environmental public goods in the Common Agricultural Policy of the EU

Action 9: better orient Rural Development to conserve biodiversity

Action 10: preserve genetic diversity of European agriculture

Action 11: encourage forest holders to protect and enhance forest biodiversity

Action 12: Integrate biodiversity measures in forest management plans

Target 4 – Ensure the sustainable use of fisheries resources.

Achieve maximum sustainable yield by 2015, a population age and size distribution indicative of a healthy stock, through fisheries management with no significant adverse impacts on other stocks, species and ecosystems, in support of achieving Good Environmental Status by 2020, as required under the Marine Strategy Framework Directive

Action 13: improve the management of fished stocks

Action 14: eliminate negative impact on fish stocks, species, habitats and ecosystems

Target 5 – Combat invasive alien species (IAS):

By 2020, Invasive Alien Species and their pathways are identified and prioritized, priority species are controlled or eradicated, and pathways are managed to prevent the introduction and establishment of new alien species.

Action 15: Strengthen the EU Plant and Animal Health Regimes

Action 16: Establish a dedicated instrument for invasive exotic species

Target 6 – Help avert global biodiversity loss.

By 2020, the EU will have increased its contribution in order to avert global biodiversity loss.

Action 17: Reduce indirect drivers of biodiversity loss

Action 18: Mobilize additional resources for the conservation of global biodiversity

Action 19: 'Biodiversity proof' EU development cooperation

Action 20: Regulate access to genetic resources and the fair and equitable sharing of benefits arising from their use

The 2011-2020 challenge in Italy

In April 2009, during the G8 Environment, with the Carta di Siracusa (Syracuse Charter), Italy made itself the promoter of the need to efficiently integrate the conservation and sustainable use of Biodiversity into future national policies due to its intrinsic value and for the importance of the ecosystem services deriving from them, which are essential to supporting long-term economic prosperity and well-being for man, despite the profound changes occurring on a global and local level.

This was the inspiration behind the creation of a National Biodiversity Strategy, with the awareness that it will entail:

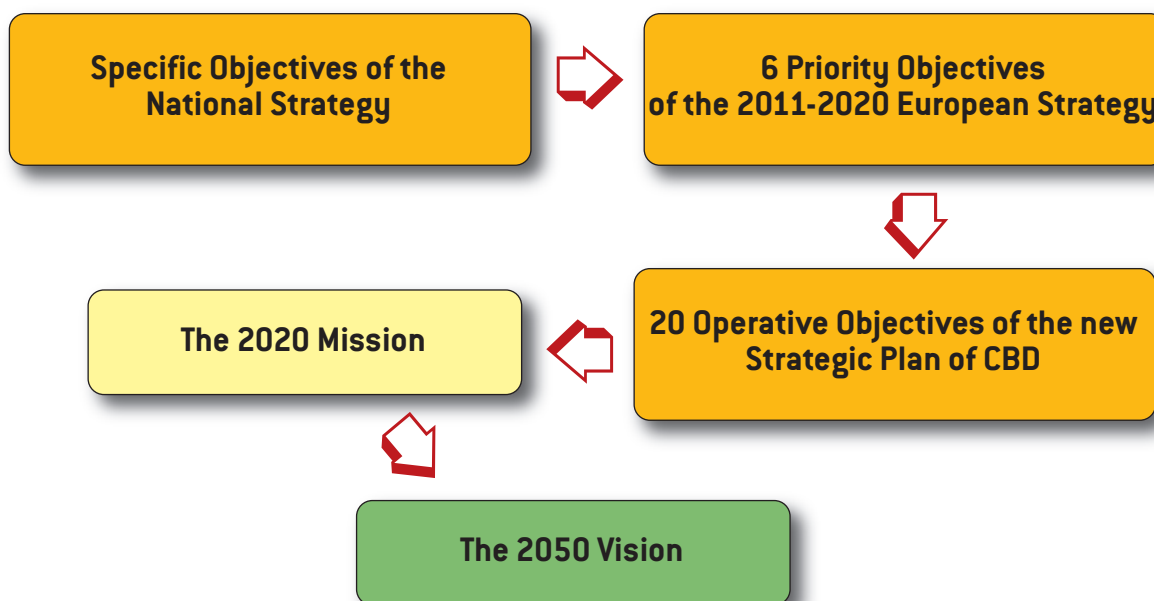
- integrating biodiversity into the most important strategies and sectoral policies;
- developing a Strategy shared with administrators, experts and stakeholders, that recognizes the central role of responsible administrations for the territory's government in order to have maximum efficiency;
- identifying and utilizing existing instruments that

already provide for the protection of Biodiversity, even though they may need improvement.

Thanks to the useful collaboration of all those who participated in the process of preparing the National Strategy, an instrument has been approved that will allow to organically develop our management of the territory on a national, regional and local level, and which will let us efficiently reach common objectives of conservation and sustainable use of Biodiversity in the next decade.

Taking into consideration the specific objectives and the priority measures to be carried out in the fifteen work areas in the National Biodiversity Strategy, it is clear that the instrument adopted by Italy is ready to respond not only to national commitments, but to European and worldwide commitments as well. Now is the time to move forward and take concrete action by investing political, economic and human resources and responsibly sharing the necessary choices and commitments in order to face the post 2010 challenge for Biodiversity.

THE 2011-2020 CHALLENGE



Essential Bibliography

AA.W. (2009) Il ruolo della natura nei cambiamenti climatici, Environmental factsheets 4pp.

AA.W. (2010) Infrastrutture verdi, Environmental factsheets 4pp.

Andersen, E., Baldock, D., Bennet, H., Beaufoy, G., Bignal, E., Brower, F., Elbersen, B., Eiden, G., Godeschalk, F., Jones, G., McCracken, D.I., Nieuwenhuizen, W., van Eupen, M., Hennekes, S., and Zervas, G., (2003), "Developing a high nature value indicator. Report for the European Environment Agency", Copenhagen.

Attorre F., Bruno F. (2010) "Servizi ecologici e valore economico degli spazi verdi urbani, tratto da "La gestione della natura negli ambienti urbani" pp.170-178.

Carraro C. (2010) Biodiversità e politiche economiche. Protecta 11. 2010 pp. 35-36.

D'Antoni S., Bonci L. (2010) La tutela delle zone umide: Protecta, 11,2010 pp. 50-52.

Landell-Mills, N., Porras, I.T. (2002). Silver Bullet or Fool's Gold? A Global Review of Markets for Environmental Services and their Impact on the Poor. IIED, London.

LIBRO BIANCO "Tabella di marcia verso uno spazio unico europeo dei trasporti - Per una politica dei trasporti competitiva e sostenibile" COM (2011) 144, Bruxelles.

Pandey S. (2010) La biodiversità vegetale per la sicurezza alimentare e l'agricoltura sostenibile. Protecta 11, 2010 pp. 12-14.

TEEB (2009) TEEB Climate Issues Update, September 2009.

Webibliography

<http://www.cbd.int>

<http://www.maweb.org/en/index.aspx>

<http://www.teebweb.org>

<http://www.faunaitalia.it/checklist>

<http://vnr.unipg.it/habitat>

<http://www.europe-aliens.org>

<http://www.bancadigermoplasma.it>

<http://www.fao.org>

<http://old.politicheagricole.it>

<http://www.reterurale.it>

<http://www.istat.it>

<http://www3.corpoforestale.it>

<http://www.direttivaacque.minambiente.it>

<http://www.worldwaterday.org>

<http://eur-lex.europa.eu>

<http://www.miur.it>

<http://www.mit.gov.it>

<http://www.unesco.it>

<http://www.oecd.org>

The full text can be downloaded from the website www.minambiente.it Natura/Biodiversità section